

```

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aaatgtttcg ttcatttaga aggtaaaatt ctctctcag acaacatcgc tgacagatgc      480
caataattc aaaaagaaat aactaatgga ttgaagcagt ttttgggtat tgagcgtcaa      540
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<210> 157
<211> 666
<212> DNA
<213> Streptococcus pneumoniae

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<400> 157
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gtctga                                          666

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<210> 158

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<211> 1152
 <212> DNA
 <213> *Streptococcus pneumoniae*

 <400> 158
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 aaacctaatt tatcaaccaa aatgcatctt gccaaccaat ttcattgtga tttaacttat 180
 tttagacagg aagaagagag cattcgattt gattcttctg taattgcott tagaaatgca 240
 gacctagcaa cacggaaaac aatagatatt caaactatgt attacataa ggtagatagt 300
 ttgattgatt attttgaaag ttttgtaatt atacctata ttataattca tgacctaaagt 360
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 caaagtattc gtttacagtt tataagcgaa atattttcag tcgaaatgaa attttttgat 1080
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 aataatttat aa 1152

<210> 159
 <211> 1788
 <212> DNA
 <213> *Streptococcus pneumoniae*

 <400> 159
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gagtatcgca ttatcgacaa cctcaaggag atgcgaaggg acaagacaac cattatcact	1620
gcccatcgcc tcagtgtctg tgtccatgca gattttatct tagttctaca aaatggctca	1680
attatcgaa caggcgacga cgaagacttg ctagcttttg atggctggta tgcccaaac	1740

taccagtctc agcagttgga aatgaaagga gaagaagatg cagaataa 1788

<210> 160
 <211> 2127
 <212> DNA
 <213> *Streptococcus pneumoniae*

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 tcaaatcaaa ctgtctttga caagtataag gagaatcaaa tgggaaaatt tgaacaagaa 180
 gccaaagatc tgcttcaggc aatcggaggc aaagaaaatg tgactgccgt aactcactgt 240
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 gatattgatg tcaattaagg tgcaggctcg gtgacagaaa ctctctgtat catcaccaac 2040
 caagatgctt atacagcgac tattcccga acttatccga caacgatoca agctggagca 2100
 tctctcatgg tcgctacaag aatctaa 2127

<210> 161

<211> 621

<212> DNA

<213> Streptococcus pneumoniae

<400> 161

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 aatcagtttc atcgaaaatc ccatgaatac aaggctatca agcgtactg gaaactcatt 180
 caacaggata gccgtaaact gagtgaatg cgattttatc gccctacttt tcgcatgcac 240
 ttaacaaata aagaaattct tgacaagatt ttaagctatt cagaagactt gaaacccac 300
 tatcagatct atcaactctt actttttcac ttccagaaca aagacctga gaaatttttc 360
 ggactcattg aggacaatct gaagcagggt catcctcttt ttccagactgt ctttaaaacc 420
 ttctcctaag ataaagaaaa gattatcaac gcccttcaac tacactattc taatgccaaa 480
 ctggaagcga ccaataatct catcaaaact atcaagcgca atgccttttg ttttcgaaac 540
 ttgaaaactt tcaaaaaaac gattttttat gctttgaaca tcaaaaaaga aaggacgaaa 600
 ttigtctctt ctcgagctta g 621

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<210> 162
<211> 1080
<212> DNA
<213> Streptococcus pneumoniae

<400> 162
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gaaggagaag tattagcctt ggtagggtgag tcaggatcag gtaaatctgt ttgacaaaag      180
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cagattacag aagttattgt aaaacaccaa ggaaaaacag ctaaagaagc gaaagaattg      420
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cgacctgatg tcttgatctg tgatgagcca acaactgcct tggatgtaac tattcaagct      600
cagattattg atttgctaaa atctttacaa aacgagtatc atttcacaac aatctttatt      660
accacagacc ttggtgtggt ggcaagtatt gcggataagg tagcggttat gtatgcagga      720
gaaatcgttg agtatggaac ggttgaggaa gtcttctatg accctcgcca tccatataca      780
tggagtctct tgtctagctt gcctcagctt gctgatgata aaggggatct ttactcaatc      840
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gactacgcaa tgcagattga cttcgaacaa aaagctcctc aattctcagt atcagagaca      960
cattgggcta aaacttggct tcttcatgag gatgctccga aagtagaaaa accagctgtg      1020
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<210> 163
<211> 942
<212> DNA
<213> Streptococcus pneumoniae

<400> 163
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gattttgcct ctgaaactat tgatgcgcca gcatattctt actggaaatc agtgtttaa      120
caatttatga agaaaaaatc aactgtatgc atgttgggaa tcttggtagc catcattttg      180

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ataagtttca tctaccaaat gttttctaag tttgatttca atgatgtcag caaggtaaac 240
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ggtaaatcgc tctttgacgg tgcctgggtc ggagctcgta actccatcct catttctgtg 360
attgcgacag tgattaaactt ggttatcggt gtttttgtcg gtggtatttg gggattttca 420
aatcagttg accgtgtcat gatggaagtt tacaacgtca tctcaaacat cccacctcct 480
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ttgttctgga ttccattgac aaccttgtc ttggtatcct tgtccctttt cgtagttggt 900
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<210> 164
<211> 1533
<212> DNA
<213> Streptococcus pneumoniae

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<400> 164
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accttggttc ctcgaaaatt gattttcaag caggatccta actataataa aattgcgaca 180
acggctgata aacgtgataa ctatgaaaat actgtgtttg agcgtatggg ctacattgag 240
tattacgata ctaaagagtt gcaagaaaag gcaagtacga tggattcttc tgtaacagta 300
gaagcaaatg cgaccaataa agctatttat gaaaagtaca tcaatcaatt aggtcatggt 360
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tttgaacgtg tttttcaact ctatgctaac ttgattgaca ttgaccatac aaataaaatc 480
caagaccctg aaaatccaga cttgaaacgc taccttcgtt ttgaaaatga tocagctatc 540
ggatggctcat tggtcggttc aggaactaaa cataaatatc tcttgtactt taacagtcag 600
ttcccatatt ttatcaaaa ctttgtgaac ttgaatttag gtgactctta cccaacctat 660

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gctaatacac cagttcttca ggttattact caaggccaag gacaaaccaa aactgccccaa 720
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cgtattaaat tgactgagaa aggaggcaaa taa 1533

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<210> 165

<211> 1038

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 165

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cgcattgatg gtgtggatac caaggctatg acgcgttcag aagtgcata tgccttttca 540

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 gtaagacaaa aacaactatt gactattgct cgtgcccttc ttaaggatgc accgcttttg 780
 attttgatg aggcgcacttc tctgtttgac acacggacag aggaattgat ccaaaaagcc 840
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 cgaaatgcag acttgatctt ggtcatgaaa gatggaaata tcatcgagca aggcaactat 960
 gaggaactga tggcgcaagg tggcttctac gctgacttgt acaatagtca atttacagaa 1020
 gatgaagcag aagaataa 1038

<210> 166

<211> 873

<212> DNA

<213> Streptococcus pneumoniae

<400> 166

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 tcgaaaatta cggatttgct aggtagtcga gaaactaatt tagatgagtt gtggcagtcg 180
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<210> 167
 <211> 1383
 <212> DNA
 <213> *Streptococcus pneumoniae*
 <400> 167
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 gcaggacttg ctaccattat ttgcgaaggt ttatcagcgg ttctctgctt ttatttatatt 660
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 aatggaagtc tctatctgca aatcagttca accttttacc ccattttgag cctcttgggt 1140
 atttatcgca attgcttgca gggcttgggg caaaagatcc ttctctagtt ttctagcttt 1200
 attgaactaa tcggaaaaat cgtttttgtg gttttgatta ttctctgggc aggtatataag 1260
 ggtgttatcc tttgtgaacc tcttatctgg gttgccatga cagttcaact gtactcttca 1320
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 tag 1383

<210> 168
 <211> 636
 <212> DNA
 <213> *Streptococcus pneumoniae*

 <400> 168
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 tttttcatcg gaagcatggt tttcgtttca ggaatctgtg ctggagtaaa ttatctttat 180
 acccgtaagc aagaagtcca tagtgtccta gccagtaaga agtcggtgaa gcttttttac 240
 agtatgttac tcttaattaa ttgttagga gctgttcttg ttttgcaga taacttggtc 300
 atcaaaaata cgctgcagca agaattagtt gactttttat tgcattcctt ctttttctta 360
 tttgggctag atttgctgat ttttttacc ttgaaaaat acgtgcgcga ttttcttgct 420
 atgctggaca gaaaaagac agtggttggt actattttag caacacttct tttcttaaga 480
 aatcaatga ccattgtctc acttctgatt tatattggac tgggcttggt ttttcgagcc 540
 tatcttgtcc caaattcggt taagaaggaa gtttcctttt atggctcatat tttccgagat 600
 cttgtattgg tcattgttac gctcattttc ttttag 636

<210> 169
 <211> 2154
 <212> DNA
 <213> *Streptococcus pneumoniae*

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 tttaaatatg agatttcttt aaatgaacta cgtgaaatct acccatcatc cagatctgga 180
 tattctctcc tatctataag taaagtttta ggagatttta atataagttc tcattgcttt 240
 aaagcttcgg taagagattt aaaaccgctc agtttcccac tcatttgctt ctgggagagt 300
 tctcatttta ttattcttga aaaaattagt aaaaacaagt ttatatattt agatcctgca 360
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 acatttaaaa agtttagatag ctttatgtct cgtaaagata ataagaagtc gcttgtttta 480
 aagtattttt ttaagtatat gaataagcta gggattttat tttttgtaac agcattattg 540

tatgtaatac aatcattagt acctatagct aatagataca taattgacac gaatttcaag	600
gacgattcgt attcgtctag aatgttattt actatattat ttatatattac tggtttcattc	660
tcactaatgt atttattaag acagatatat gtgcatcct taaaatatat aatggataaa	720
gagattagct atgattttat gaaacatttg atatatttac cttacagttt ttatgaaaaa	780
cgtacttttag gggatatact ttttagagct aactctattg ttatatataag agaaatacta	840
tcaaataatt ttatagcagc tatacttgat ttgttaatga ttgtggttta tgctgtggtt	900
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aaggttaatg ttcaaaaat tacttccgaa gtaatttcta aaaatagtga tattaagcta	1080
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gatgtgttta atactaaatc cgaattaatt ccagaaagag tcagtcaaga tataaaattt	1440
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tcttacttaa gtgaaatcgg taccactaag atttttaatt cccatcgact agatactatc	2040
aagtctcgag ataagatctt agtaatgcac aatggtgaaa ttgtagagat tgggaccat	2100
agagaacttc ttgaactagg aggcatttat aagcaattgt attcaataa ttag	2154

<210> 170
 <211> 369
 <212> DNA
 <213> *Streptococcus pneumoniae*

<400> 170
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 gaacaaagt ttggatagttt catagataat gttaatTTAA ttgagttgga agagagaatt 180
 caaactacta ttggaattaa acaataaac acacacaata ttattactat tgcccgagaa 240
 gggtagcttc aaaattattt acctaacact tcagaaaata catataattc attacaagtc 300
 agtttagttg gagtattact actttttata agtatggtaa atattttatg ggctaaaaaa 360
 agtaaatga 369

<210> 171
 <211> 645
 <212> DNA
 <213> *Streptococcus pneumoniae*

<400> 171
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 ggtagcggaa aaacaacctt gatgaacatg attgggaaat tagaacctta tgatgggagc 180
 attttttacc gaggtaaaga cttggccaat tataaatcaa gtgatttttt ccgtcacgaa 240
 ttgggctacc tcttcagaaa ctttggctta attgaaaacc aaagtattga agaaaaacct 300
 aagctaggtc tcatttggtca aaagttgagt cggtcggaac agcggttagc gcgaagcag 360
 gctttagaac aggtcgccct ggtttatctt gacctagata agcgcatctt tgagttatcg 420
 ggcgagaaat cgcaacgggt tgccttgcca aaattatct taaagaatcc accctttatt 480
 ctggcagatg agccaacgac ttcaatagac coagcaacct ctgattgat tatggagatt 540
 ttgctatctc ttcgagatga taataggcta atcattatcg caacacataa tccggcaatt 600
 tgggagatgg ctgatgaagt gttcaogatg gatcatctga aataa 645

<210> 172
 <211> 1041
 <212> DNA
 <213> *Streptococcus pneumoniae*

<400> 172
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 cgccaagtcc ttaaagtaaa tgacacagaa gataaggaag ctggtgccta tcaattcggt 180
 acggttggtg ttcaacatgc cactttagct catatgattt atgcttggtt gacacctttt 240
 acagatattc gtatgctca ggagactaca ggtgggttctt ccgatgttga atttatgcga 300
 atcaatcaat totacatgca aacatogcaa aatatggcca agtatcaagg actaaaaca 360
 gctggttaagg atatcgaaact caagtacttt ggagtttatg ttttgaatgt gacggataat 420
 tcaaccttta aagggtattct caatatctct gatacagtca cagcagtcga tgatcagacc 480
 ttgtatagtt ccaagactt gattgattac gtcagttctc aaaaattagg ggattcogtc 540
 aagggtccct atgaagagga tgggcaaac aagctctgcag aaggaaaaat catcaccttg 600
 gaaaatggca aaaatggaat tggaaatggc ttgattgacc gtacagagggt aatcagaat 660
 gtcccaatta gcttttcaac agctgggtatt ggcggtccaa gtgtgtgtct catgtttagt 720
 ctagtctatc atactcaaat agctcaccca gatcttcgta atgggtcgat tggttcoggt 780
 acaggtagca ttgaccgca tggtaatgtg ggagacattg gaggtattga taagaagggt 840
 gtagcttcgg ctaggcgagg tgctgctatt ttctttgctc ctgataaccc tggtagcgaa 900
 gaagaacaaa aggcgcaccc ggacgcgaaa aacaactacc aaacagccct agaagcggtc 960
 aaaaacatca agacggatat gaaaatcgtg ccggttaaaa ccctacaaga tgcgattgat 1020
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<210> 173
 <211> 960
 <212> DNA
 <213> Streptococcus pneumoniae

<400> 173
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 acaggtcagc caacaggatt tatttggaa acgatggag cgcctatggc tgaagccatc 180
 aagtacttcg ctactgataa aggtctaggc tttggtgtcg ctatcattat cgtaaccatt 240
 atcgtacgct tgattatctt accacttggt atctaccaat catggaaggc aacgcttcac 300
 tctgaaaaga tgaagccct caagcacgct cttgagccac accaaaacgcg tctcaagaa 360

gcgactactc aagaagaaaa actcgaagcc caacaagctc tctttgtctgc tcaaaaaagag 420
 caccgtatca gcatgttttg cgggttagga tgtttcccta tctctcttca aatgcctttc 480
 ttctctgcta tctactttgc tgcccaacat actgaagggg ttgctcaagc aagctaccta 540
 ggcattcttc taggttctcc aagtatgatt ttggttgctt gtgctggtgt cctttactat 600
 cttaaatgc tctttcact tcacggagta gaagatgaaa tgcaagaga acaaatcaag 660
 aaaatgatth acatgagccc actcatgac gtcgtcttct cctctcttct accagctagt 720
 gtcacacttt actgggttgt cgggtgtttc atgatgattc tccaacagtt tatcgtcaac 780
 tatatcgttc gtccaaaact tcgcaaaaaa gtcogtgaag aactagccaa gaaccacca 840
 aaagcaagtg cttttctctaa accaagtga cgaaaagagc ttaccctga acaaccaact 900
 gctatcacia gcaagaaaaa acacaaaaat cgcaacgctg gaaaacaacy ttcgagataa 960

<210> 174
 <211> 654
 <212> DNA
 <213> Streptococcus pneumoniae

<400> 174
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 ttctctggtt tgaatctcaa gctggagaag ggcaagggtt atgccttaat cggaagaggt 120
 ggaagcggaa agacgacgct gctgaatatc ttgggaaagc tagaaaagat agatggtgga 180
 agggttctct atcaggggaa agatttaaaa accattccca ctctgtagta tttctgagac 240
 cagatgggct atctctttca aaatttggc ctcttagaaa accaatcaat caaagaaaat 300
 ttggatttgg gttttgttgg tcagaaaatc tcaaaagtag aacgtttgga aaggcaagtg 360
 ggggctttag aaaaagttaa tctagggtat ttggatttag aacaaaaaat ctatacttta 420
 tctgggggag aggcccaacg agtgccctt gotaagacta ttttga meta tocaccttg 480
 attttggcag atgaaccaac agcagctctt gatcctgaaa attcagagga ggttatgaat 540
 ctcttggtgg atttgaaaga tgaaaaatga attatcatca ttgcgaccca taatccocta 600
 gtctggaata aggcctgatga aatcattgat atgaggaaac ttgctcatgt gtga 654

<210> 175
 <211> 2055
 <212> DNA
 <213> Streptococcus pneumoniae

<400> 175
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 tatecttctg ttgatgtgac aggaatgatg ataatcaac cagtagctag tcgcgaagag 180
 gtgacagagg ctttgagtca cttggcggta gagcacaata gtctcattgc tcgtcgaaac 240
 gttgagccaa atgaagctgg agaaacacgc tttacctatg ccacttatgg tgggggaaag 300
 cttccagaag gtctgacctt ttctccaag gagagtgcag aaacgagtga tttattaggg 360
 tcttacttga ttgtatcagg aagtttggat ggagtgcgt tacagaccac cttgaaagag 420
 cttggttata aaggctttgt ttcgatgga gaagatccat tttcgatagt cttactattg 480
 acggccaccc ctatgggtct actgagttta gctatttttc tgctgacctt tatgagtctg 540
 acctgattt atcggatcaa atccctctgt caggcaggga ttgccttaac agctgggtgag 600
 agcttgtttg gagttgctct cagaccagtg ttagaagatg tgagacagct tatctgtcca 660
 gtgctgggat ccagctcttt gggattgggg attctctggt atcaagggtc cttgtttatg 720
 gcaacggtgc aactggtcat cattgctctt ctactttatg gattgacctt ggcagggtatt 780
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 gacgttcacg gcaagtattt actggcgcaa ggaggagttc tcttgcttgg cctagtccca 1920
 tctagtattt tgacaagaga tggtttgatt agcgctctag ttgtagcttt gtttacgctt 1980
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 ttgaaaggaa aataa 2055

<210> 176
 <211> 897
 <212> DNA
 <213> *Streptococcus pneumoniae*

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 cccaatgggt ctgggaagac cacactcttg gactgtctgc ttggagataa actgggcaca 180
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 ttctcttttg tcttgacctt gattgggcga ccaagccttg tctttttaga tgaaccaact 480
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 tctaacttgg ttgaaaactg gtcacaaaaa caggatgctc tacaagtagt cacacgcgaa 780
 gcagatgctt tttgggaact gttagtctaa gcaggatgtg gcatacaga aattgaagtt 840
 aataatcgta gtttggttga tacaatcttt gaagaaacgc agaaggaga taactaa 897

<210> 177
 <211> 1320
 <212> DNA
 <213> *Streptococcus pneumoniae*

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 gtaatgccat tatatat tttt ggcaggttta atcgctcttt tgaacaacac ggtatttaag 180
 tggattttcc aaggggatac attaacaaga ttccaatatt ggggaataac aattgcaaac 240
 ggtacttta gttattcagg tatgattatt gctgtaatgg ttggttattt cttagctaaa 300
 aacagagatt tcgaaaacc gttagcagca tcaatgctat cattagt ttc ttaattgtg 360
 atgatgccaa atacagtttc tgtagttcct gacggagcaa aagatgcggg aaacatttca 420
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 gtcactcctt tatttggggg tgttcagca ttattattca atataactgg aatgaactta 660
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 ggggtcatta ttatttactc tttaggaaat atgttatggc tatttggtat tcaccaagca 780
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<210> 178
 <211> 2706
 <212> DNA
 <213> *Streptococcus pneumoniae*

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<400> 178
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gactacatcg ttgccaaagc atcagtagca gctttggatg cccacggaga attggcttta 240
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<210> 179

<211> 318

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 179

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 agcttaataa aactacaaaa aggcctatgaa gtgattacaa tcgggtgact ttatggaaca 180
 gtcatgaag tagatacga gaagggaaca atagttcttg acgtagatgg agtttacttg 240
 acttttgaac tagctgctat caagacagta ttaccgctga aagaacagc ttactagaa 300

ggcgcaattg aaaaataa 318

<210> 180
 <211> 1824
 <212> DNA
 <213> Streptococcus pneumoniae

<400> 180
 actcgtatgc gcattaaatg gttttccttg attaggatta taggtttact tttggtactc 60
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 gagcatccag aaatttgggc tggacagac caggttcatt tcgggagtg gagtagcact 1740
 atcgaagcag gagcaaaatt gtatgcagat acgattgcc aagcttttga gacagctcaa 1800
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<210> 181
 <211> 360
 <212> DNA
 <213> Streptococcus pneumoniae

<400> 181
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 gctcatccgt cagtaagttc attgttcaaa aatcaaggaa tttataaggc tctgctagga 180
 gtctttctct tgtatgtcat ttatttctca cagaatttag aaattgtgac tatttttctc 240
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 aaacaagggt gatcagctat ttggccttg attagtattt tactctttaa atacacttga 360

<210> 182
 <211> 1848
 <212> DNA
 <213> Streptococcus pneumoniae

<400> 182
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 tacaagttct cattttagt gtcatcctg atgattgttc tggcgacttt tgcccaagcc 180
 ctctttccag tottttcttg acaagcgggt acgcagctag ccaatttagt tcaagcttat 240
 caaaatggca atccagaact tglatggcaa agcctatcag gaatcatggt caatcttggc 300
 ctgctgggtt tgggtctatt tatctctagt gtaatatata tgtgtctcat gacgcgcgtg 360

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atgtgcagaat cgaccaacga gatgcgcaaa ggccctctttg gtaagccttg tcagttgacg 420
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<210> 183

<211> 768

<212> DNA

<213> Streptococcus pneumoniae

<400> 183
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tttcaagcct taaaaaatat ttcgattcaa ttaccagaaa gacagattac tgccttgata 120
ggcccatctg gttgtggcaa atcaactttt ctaaaaaccc ttaaccggat gaacgatattg 180
gttctcttct gccatatga aggccaagtc ctcttagatg agcaagatat ttatagtagc 240
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gtcaagatg atcttaaaaa gagtgccatg tccttatctg gcggtcagca gcaacgcctt 480
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gccttagacc ctatctccac tttaaaaatt gaagacctca ttcagcaact aaaaaggat 600
tatacgatta tcaattgtac ccataacatg caacaagctt cagctatttc agataaaact 660
gcttttttct taacaggaga aatttgcgaa ttggagata ccggtgacgt gtttaccat 720
ccaaaagatc agcgcacaga agactatatt tcaggacggt tcggataa 768

<210> 184
<211> 681
<212> DNA
<213> *Streptococcus pneumoniae*

<400> 184
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ttatttcgat ttggagccat gtatgggcca gctattcgcc tctttccga gcagggttgg 180
cgtctcttgt ctgccatttt tgttcatatt ggggtggaac atttcattgt taatatgctt 240
tcactttatt atcttgaag gcaggtagag gagattttcg gttctaagca gttttctttt 300
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tatgcaactc gcaatcctta tatccaacag ctagggcaat cctatctgac accttttgtg 480
gttaacatta ttggaagtgt tctgattcca ggaatcagcc tagcaggcca tatcggtggt 540
gcagttggtg gcgcatttct agcagttatc tttccagtta gaggagaaaa acggatgtat 600

aacaccagcc agagattagg agcggtagtc ttgttcgtag gactcgccat tttgcttttc 660
 tacaaggga tgggattgtg a 681

<210> 185
 <211> 789
 <212> DNA
 <213> Streptococcus pneumoniae

<400> 185
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 attatccaat ttatcgccaa tgctgaaaag aaaaccagtg tcaaagtaac ctttgagggg 180
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 caagatgctc gtaattctgc agttcctttg ctagataagc gtgctatcaa cgctcgtatc 360
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 ggatctgtta tcaatatcgg tgctgaaatc ggtgctggaa ccatgattga catgggtgcc 480
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 ggtgctaatt cagtggttat cgaaggagtc caaatcggtg gtggttcagt tgcgcagca 660
 ggagctattg ttaccaaga tgtcccgaa aacgtggtag tagcaggtgt tccagctcgt 720
 attatcaaag aaattgatgc ccaactcaa caaaaaacag cgctagagga tgcgcttcgt 780
 accttgtaa 789

<210> 186
 <211> 1203
 <212> DNA
 <213> Streptococcus pneumoniae

<400> 186
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 gttatcgctt tgctattggc ggaagtgtg cggtattatc gaatgcttg tctagtattg 120
 tggggagtct accaactcca tccagctcca gcagttcaag tagtagttct agcgatagca 180
 gtaactcaag tactacacga ccttcttctt caaggcgag acgataattc tctaaatgaa 240
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tatcagaaaa agattgttaa cggaaaaatt tattcgctcc tatccggctt aatatgggga	360
atctgtggaa ttttaggaga gtacttcttt actcattatc aggtgtcttc gggtgggatt	420
acctctatgc gtttgacact ggcaggagggt cttgtactca tttggtctgc aatacaatta	480
aaatcgcaag tgctagatat ttggcgagac aagaaaaatt acctgccctt tttagcctat	540
gctattttgg ggatttttct agttcagtat tttttctatc tctgtgtaga atactcaaat	600
gctacgacag caactatttt acagtttatt agccctgtct ttatcctctt ttacaatcgc	660
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tttgcctaagc gttatggttt tgttctctac gttgggtggg ggaatgattt ggcaggtttg	900
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tctgtctctc tgagtgtttt gttcttagga ttagtagtgg attggtccct ccttctagct	1140
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taa	1203

<210> 187
 <211> 588
 <212> DNA
 <213> *Streptococcus pneumoniae*

<400> 187	
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caaatgaaa caaatatgga acttcaacct gtcactctc taacagaaga acaaatcaat	180
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gtaattaacc gacaattaca aggcgattat acaatcccac ctacatactc tccatttga	300
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gatgttgctt tagaattcgc tatgaattta ttatcaccgg ggacttattt agcacaatta 540
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 <210> 188
 <211> 1314
 <212> DNA
 <213> *Streptococcus pneumoniae*

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<210> 189
 <211> 888
 <212> DNA
 <213> *Streptococcus pneumoniae*

 <400> 189
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<210> 190
 <211> 825
 <212> DNA
 <213> *Streptococcus pneumoniae*

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 atcttttata aaacacattt ccgtgatcca aattaccata aatag 825

<210> 191
 <211> 948
 <212> DNA
 <213> *Streptococcus pneumoniae*

<400> 191
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 atttcggcct ctctgtgtcta tgggttttta tcagcagtag cagttaattt cttttccaa 180
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 acctttggtt ggaatatcgc tctttattct atgattacca tctttgtctc tagccgtgtg 660
 acagacgcag tctttactaa gcaaaagcgt atgcaggcca tgattgtgac aaatcatcca 720
 gagaaggtaa ttgaaaaaat ccataaaaaa ttgcaccgag gagcaacccat gatccagat 780
 gcagaaggaa cctataatca cgagagaaag gcagttttta tcaactgtcat tacacgtgca 840
 gagttaaatg aatttaaaca gattatgaca caagtggatc caagctcctt tgtctctgtc 900

tcggaaaatg ttcatattct aggaagatgt gttgagatag ataattag 948

<210> 192
 <211> 282
 <212> DNA
 <213> Streptococcus pneumoniae

<400> 192
 tttagtcggc tttttgatga ttctcatgct ataatagagt caggagggtca catgaaacga 60
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 tatgccttca aaggcgattt cttctataac tatctagcag ttgtctttgc tctcattgca 180
 ggtgtactgc gttttgggac ggcttacata acggaattg tcttgctctg aaaggcagcc 240
 gaaatcgctg aaaagcgtaa agcaggcaaa aattcaaat aa 282

<210> 193
 <211> 840
 <212> DNA
 <213> Streptococcus pneumoniae

<400> 193
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 tgtaggagcc atccatgttt atatcaatgt gatgcagtta cctatggtaa aacgttatatt 180
 caaataaagg agttatctat gaaattactt aaaaaccttg gctggattct tctagccctt 240
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 tttatttggc ttctctgctt ggtttgggtc ttatctctgg tcgttcaatt cttcttgcca 480
 gatgatcctt cagtaaatca gcaaatagcg acagacttga ccttgcttca accacttttc 540
 tcattctttg ctgtggttat ttttgcctct ttgacggaag agattgtttt tagaggggatg 600
 ttgacacgct atctctttcc taagcaggac aatagtaaac gaacctgat ttttcttctg 660
 gtatctagtc ttctatttgc cttgattcat tttccagggt atgtgcaaca attttttgtc 720
 tattttagcc ttggttttag tttgggtttg gcttacatta gcagaaaagg tctggcttac 780
 agtattttct ttcacgcttt gaataattta gtcggctttt tgatgattct catgctataa 840

<210> 194
 <211> 717
 <212> DNA
 <213> *Streptococcus pneumoniae*

<400> 194
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 tcagctatct gtttactgat aggtttcatt agtatgtttt tgactttcaa tttcttaaaag 180
 aaaagcagaa aatttcattc tttgtatcaa gaggaatgg atgacgatct gaatgaaacc 240
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 ctttttaaaa ccattcgcgt ttgtctgcag ttgtatttgg aattttctgc tacacaaaag 480
 gatgtcttga actataataa ttcttatgat gaaggggagc gtcaggctaa tttggaacag 540
 agttttcgaa ttttattcca attacaccaa tatgtcttac cagccttata ttttttctt 600
 attatcattt ctttcttgac aggagagatt cagttactag ctttcttgc tgtaggagcc 660
 atccatgttt atatcaatgt gatgcagtta cctatggtaa aacgttatct caaataa 717

<210> 195
 <211> 1866
 <212> DNA
 <213> *Streptococcus pneumoniae*

<400> 195
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 ggaagtatta ttcaacaaaa taatatcaaa tataaggctt taactgtaga aggtaacata 180
 ggaactgttc aagtgggtaa tggagttact cctgtagagt ttgaagctgg tcaagatgga 240
 aaaccattca cgattcctac aaaaatcaca gtagggtata aagtatttac cgttactgaa 300
 gtacgtagtc aagcttttag ttattatcca gatgaaacag gtagaattgt ctactatcct 360
 agctctatta ctatcccatc aagcataaaa aaaatacaaa aaaaaggctt ccatgggaagt 420
 aaagctaaaa ctattatttt tgacaaaggc agtcagctgg agaaaattga agatagagct 480
 tttgatTTTT ctgaattaga agagattgaa ttgctgcgat ctctagaata tattggaaca 540

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agtcgcat tttttagtca aaaattgaaa aagctaacct ttctctcaag ttcaaaatta 600
gaattaatat cacatgaggc ttttgctaatt ttatcaaaatt tagagaaact aacattacca 660
aaatcggtta aaacattagg aagtaatacta tttagactca ctactagctt aaaacatggt 720
gatgttgaag aaggaaatga atcggtttgcc tcagttgatg gtgttttggt ttcaaaagat 780
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gagacaaaag aacttgcac atattcggtt aataaaaatt ctacttgaa aaaactcgaa 900
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ttattagtaa acacgactac acccgatggc tatcgagtca atgctaacgg tgagtgggta 1860
ggatag 1866

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<210> 196

<211> 1185

<212> DNA

<213> Streptococcus pneumoniae

<400> 196

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ttaaaccac tggtatcaga aggaatcgaa tatgtcatct ttagcgatgt agagccaaac 240
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<210> 197

<211> 783

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 197

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gaggagctta tgataaaga tgaactgtga cttgaattga ttgaaattat caaaaagaaa 60
aaaagaattg cgtgaaaga gctggcgaa atcactttct ccagcacaag taccttaactg 120
cgtgatttaa ttttcttaga aaatcaagg cttatcaaaa gaaagcaccg atacgtgacc 180
ctgtcctcta tgaacacaat tgaactttct catcaaatc gtgaaggaga aagtactagg 240
caaaaagac taatcgctag tctcgctaaa gactttattc ggtctggtat gtgtatctat 300

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ctagattceta gtaactactgt ctacgaactc tgtccctatc tttctgaact tgataatttg 360
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tccaaaatct tttacacatc tggcgaggtc aaacatcaat cctgttccgt ggtcaactat 480
gataaggaaa attctttatt agatcatttt aatatcgatt tagcattttg ttcagcaaga 540
ggtattgatg accaatatgt ttatgaagct tctctcagcc aagctatttc aaaaaagaat 600
attattgaca aagcccatga aaccatctta ctgattgata gttctaaatt ttacaagact 660
ggatttttta aaattaatcc cctctccaaa tacacaacct ttatttcaga caccgtgccca 720
gatcaaaaat tattagacgc agtcgaatta tttgatggag aatgggttgc tgatattcaa 780
tga 783

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<210> 198
<211> 870
<212> DNA
<213> Streptococcus pneumoniae

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<400> 198
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agtgtatacc ttagccacgt ctcactttca ggtgtagcct ttggtctggg tttgggggatt 240
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cgtacgggtt acaagagctt tatggaaate gggacagcta tctcatgtgc aacaggtctg 360
gctgtttctc tgattgtcat gagcaagggt aaaagctcga gttcaatgag tttggacca 420
tatctctttg gtctgatcgt gactatcagt gaagaacagg tcatttcctc ctttgcatt 480
gcggcggttg ttttgatttt gacctttctc tttctctgct ctatgtatat cttaactttt 540
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atggtgacag ggggtgctat tgccttatg attcctgcag caggagctct tctggtatcg 660
accattatgg tcttgccagc tagtattgcc ctgcgtctgg ggaaaaactt taaactcggt 720
atgctgcttg ccagtgogat tggctttttg ggaatggtag caggacttta catttctac 780
tatgcagaaa caccctgcaag tgcaagtatt accattattt ttgtaactgt ctttatacta 840
atcagtttag taagacgttt tatcaaatag 870

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<210> 199
<211> 756
<212> DNA
<213> Streptococcus pneumoniae

<400> 199
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tatttggttg atagtgggga atttgttacc ttgactgggg aaaatggagc ggctaagagc      180
acgctcatca aggctagtct tggaattctg caaccacgca ttggaaagggt ggctatttca      240
aagacaaata cgcaaggtaa gaaattgaga atagcctatc ttctcaaca aattgccagt      300
tttaattgctg gttttccaag tacggtctat gaatttgta agtcgggtcg ctatccgaga      360
aaaggctggt tccgtcgttt gaatgctcat gatgaggagc atatcaaggc tagtctggac      420
tcagttggca tgtgggaaca tcgagacaaa cgcttggggg ctctatctgg gggacaaaag      480
cagcgagcgg taattgcgcg tatgtttgct tctgacctg atgtgtttat cctagacgag      540
ccgacaacgg ggatggatgc aggaagtaaa aatgaatgtt acgaactcat gccaccacgc      600
gcccatcatc atggcaaggc tgttttgatg attaccoatg acctgaaga agttaaggat      660
tatgcggatc gcaattattc tctagtcctg aaccaagact cgccatggcg ttgtttcaat      720
gttcatgaga atggccagga ggtggggcat gcttag      756

<210> 200
<211> 1566
<212> DNA
<213> Streptococcus pneumoniae

<400> 200
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ggcgatttaa aggcctgatc ggatagtttg gctgcagtca ttgaccaact aggtctgcct      180
gagaagtctc ctgtggttgt ttttgggtgc caagaatatg aaatgttggc aacctttgta      240
gcgctgacta agtcagggtc tgccctacatt ccaattgata gccattcggc cttggagcga      300
gtttcagcta ttttagaagt agcagagcca agcttgatta ttgccatttc agcctttccc      360
ttggagcagg tttctacacc aatgataaat ctagctcagg ttcaagaagc ctttgcccaa      420
gggaataact atgaatcac gcatccagtc aaggggagatg ataattacta cattatcttt      480

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acttctggta cgactggtaa gcctaaggga gtgcagattt cacatgataa tctctcagc 540
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<210> 201

<211> 450

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 201

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 cattcaggtg ttatcattaa tgggtcaacgt tataaaacac tagttgttac accacaggga 180
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gcagcctcta agcgtgtgat gtattcagtc agtcgtttta ttgagaaacg gctaggtttg 360
 aaagtaaca tgaccaagag agttgaaata tctaggtttt gggttcttga aattatcaga 420
 tggttggaaa agcgcctcac atcaagatag 450

<210> 202
 <211> 429
 <212> DNA
 <213> Streptococcus pneumoniae

<400> 202
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 gtggattag 429

<210> 203
 <211> 528
 <212> DNA
 <213> Streptococcus pneumoniae

<400> 203
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 gtatagatga tgtcgatctt tatagtcctat agcttgggtac cgacgatgat tttaaatctt 480
 ttatggatta ctgtttttca attttttttt gaaaaatatt atctataa 528

<210> 204
 <211> 1323
 <212> DNA
 <213> *Streptococcus pneumoniae*

<400> 204
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 ggtgagataa tttttgattt gcgaaaaatt ttacaggaaa ttactttaga ggatgtcctt 1260
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 tag 1323

<210> 205

<211> 1650
 <212> DNA
 <213> *Streptococcus pneumoniae*

<400> 205
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 ttaatcgggtg ctaatgggtgc cggaaaatca acottttttaa aaatttttagc tggagatatc 180
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 gaatctatct caagcttgaa tgatggattg aaaaacttta aagaatcaat catctttgac 1500

agccatgacc acgaatttat tcaaactttg gctaaccata tcattgtcctt atctaaaaat 1560
 ggcgtcattg accgatatga tgaacctac gatgaattcc tagaaaatgc agaagtacaa 1620
 gcaaaagtta aagaactttg gaaagactaa 1650

<210> 206
 <211> 2586
 <212> DNA
 <213> *Streptococcus pneumoniae*

<400> 206
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 agtatctact ggaatagcga caactctcct ctattaggag atggctttca tcaatcgtt 180
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 gcgcctctgg ttactttttt tgatctaacy aatatgccag atgctatcta tctgacaaact 360
 ctcttaaaat ttggattgat tggctgtca acccttttta gtttgaataa attgtttcaa 420
 tctatccctc agatttttaa actagcctta tctacttctc atgctctgat gaggttcact 480
 gtcagtcaat tagagataaa aacctggcta gatgttttta tcttgattcc tttaattata 540
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 tatctctgtc aaatttctgtg ggactttaag actcgaaaat catctgttct tgatttcata 720
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 gatggtgaaga aaatagaat taacaagct caaactggat ttatgaaagt tgacattccc 2460
 aaggggaag gaactattac actttccttc attccaatg gttttattac tggagcaatc 2520
 tgttccttta cttctctctt actattttga atctataatc acagacgaaa gtcactaag 2580
 gcataa 2586

<210> 207

<211> 753

<212> DNA

<213> Streptococcus pneumoniae

<400> 207

atgaaagttt taattttaga agatgttatt gaacatcaag tgagactaga gagaatatg 60

gatgaaattt cgaagaatc gaattttcca atatcataca agacaacggg aaaagtccgt	120
gaatttgaag aatacattga aaatgatgaa gtaaatcagc tttatttctt agatatogat	180
attcatggaa ttgagaaaaa gggatttgaa gtggctcagc tcattcgtca ttacaatcct	240
taogctatta tcgtctttat cactagtcga tcagagtttg cgactcctaac ctataaatac	300
caggatcag ccttagattt tgttgataag gatataatg atgagatgtt taagaagaga	360
attgagcaaa atatcttcta cacgaagagt atgttacttg aaaaagaaga tgttgtagat	420
tatttcgact acaattacaa gggaaatgat ttaaaaattc cttaccatga tattttgtat	480
attgaaacaa caggggtatc tcataaattg cgcattattg gtaagaattt tgcaaaagag	540
tttttggtg ccatgcacaga tatttcaggaa aaggacaaac ataactcagcg atttttattct	600
cctcacaagt catttttggg aaatataagg aatatcagag aaattgatcg aaaaaactta	660
gaaattgttt tctatgaaga ccatcgttgt cctatttcaa gattaaaaat tagaaaatta	720
aaagatattt tagagaaaaa atctcaaaag tga	753

<210> 208

<211> 1338

<212> DNA

<213> Streptococcus pneumoniae

<400> 208

ggagaaagag taatggattt acttggattt gggacagtta ttgttcaattt tttaattatt	60
agtcacaggt accgtttaat ttgtaaaggt cgaataaata gaaaagaatt atacgttttt	120
ggtgcttata cattactaac tgaatatagta cttgaatttt ccttttatct tctatattta	180
gataaaatag ggattgaaag attttttatt cctttgggct tatattccta ttttcgatgg	240
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gagagcactc ataactttct gtccgtaatt ttctcctcta taacaggaga taattttggt	360
ttacaatatc atttccattt ctttttcgtt gtgacgggtg taacctattt tgttacatta	420
aaaatcattt actatttcca ttggaaacta gcctattttg acaaggacta cctttatcct	480
ttcttgaaaa aagtattttt tgccttacta ttgctacata ttgtatcttt cgtttcagat	540
atggtaagta cgattaaaca tttgaatagt tttggaagta ttttgtcatc tattgtcttt	600
atctctctcc ttttgacctt ctttgcaatg aattctcata aagttcaaat ggagaaagag	660
attgctttga agcagaagaa atttgaacag aacattttac agaattacac agatgaaatt	720

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gttggtctgt ataataaaat cgtgggtttt cgacatgatt atgctggaat gcttgtcagc 780
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ttagtcaaag caaatcataa attgcgttca gataagtaca ctactttga tttgaacaac 900
atagaagact cagctttacg aagtttgggt gctcagbcaa ttgtctatgc tggaaataat 960
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aacaatatta ttttagaaac agagatggaa ggcagtacat ttagacaat cattagattt 1320
aagagggaat ttgaatga 1338

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<210> 209
<211> 375
<212> DNA
<213> Streptococcus pneumoniae

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<400> 209
aagaaaatgt ctaaaaatat tgtacaattg aataattcct ttattcaaaa tgaataccaa 60
cgtcgtcgtc acctgatgaa agaacgacaa aaacggaatc gttttatggg aggggtattg 120
attttgatta tgctattatt tatcttgcca acttttaatt tagcgcagag ttatcagcaa 180
ttactccaaa gacgtcagca attagcagac ttgcaaaact agtatcaaac tttgagtgat 240
gaaaaggata aggagacagc atttgctacc aagttgaaag atgaagatta tgctgctaaa 300
tatacacgag cgaagtacta ttattctaag tcgagggaaa aagtttatac gattcctgac 360
ttgcttcaaa ggtga 375

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<210> 210
<211> 1383
<212> DNA
<213> Streptococcus pneumoniae

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<400> 210
agatatagaa agagggttgt catcgcaag aaaaaagcga catttgtatg tcaaaattgt 60
gggtataatt cccctaata tctgggacgt tgccccaact gtgggtcttg gtcttctttt 120
gtggaagagg ttgaggttgc cgaagttaag aatgcgcgtg tgccttgac aggtgagaaa 180

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accaagccca tgaaactagc tgaggcgact tccatcaatg tcaatcgaac caagacggag 240
atggaggaat tcaaccgtgt gcttgagggc ggagtggtac caggaagtct cgtccttacc 300
ggtggggatc ctgggattgg gaaatcaact cttctcctac aagtctcaac ccagttgtcc 360
caagtgggga cagttctcta tgtcagtggt gagtggtctg cccagcagat taaactacgt 420
gcagagcgct tagtgatata tgatagttag ttttatctct atgcagagac caatatgcag 480
agtgttcgtg cagaagtggg gcgtatccag ccagactttc tcattattga ttccatccag 540
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aaactgggct ttactaagat ttatgtacct aagaattcct tgacaggaat cactctgcct 1320
aaggaaattc aggtcattgg cgtgacaacg attcaggaag tcttgaaaaa ggtctttgca 1380
taa 1383

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<210> 211
<211> 753
<212> DNA
<213> Streptococcus pneumoniae

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<400> 211
aaccatctac taccggagc gttcgaggtc aggtgcggaa tatggactaa tgggagtttc 60
tatctttcta gctctctttt acatgattcc ggctctttat tttctcttcc gtattgggaa 120
aatgggaat tgccaaagaa ggttttgatt ctgtctttat tgggagggat gttcctttca 180

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ggctgggtgt ctagttttgc taatacttat atccatgatt tactgggggt tcttttccca	240
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ttagccttgg gaactcactt cttgtttaac tctccttttg tggagttgga aacagagttg	660
cctttacgca ttccagtgtt tacggctatt gctctctatg gtttttatca tgcttattgc	720
tttgttgaga aacacaatga gttgatgacc tag	753

<210> 212

<211> 2187

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 212

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gcagatatga cgttttttga cttgcgggat ttaacttttc cttttgttgc ccattgtcgt	300
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attgggctag tcactgtcta catcttcag caaatcttgt cttacgctca ggagtatctc	720
ttgcttgttt tggggcaacg cttgtcgatt gacgtgattt tgtcctatat caagcatgtt	780
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ttttacgcc atttggtcaa tagctag 2187

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<210> 213
<211> 960
<212> DNA
<213> Streptococcus pneumoniae

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<400> 213
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<210> 214

<211> 1179

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 214

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aagaggattt atatgaaaaa gcaatcactc tttttgttc cagggtattat cctgattgggt 60
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ctggaggtag aagttagttc gcttgggtgc ttgaccagcc tgcctctcct tatgtttacc 180
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tggaaaggag ttatccttct cctcacgtta cctgtcttag caactttttt ggtctggctc 540

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ccaaatcacc gctataatca tagactagct ccacaaacca aacaaaaaag tcaataaaag 600
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ttccactctt ggggtaccatc tgtagctgcc ctcttgctca tcgatatact gatgactgtg 1140
gccctcttta cagtggacag agcggataag atccttta 1179

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```

<210> 215
<211> 453
<212> DNA
<213> Streptococcus pneumoniae

```

```

<400> 215
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gccttgactc tggctgcagg tggaaacacct tatcaggcca gtcaagctat tgcctttgtc 180
attaaaaata tgctaggcct catctgtgac cctgttgacg gtttggtcga agttccctgt 240
gtcaaacgta atgccatggg agctagcttt gctttcatcg cagcagacat gcccttgcca 300
ggtatcgaaat ctaaaatccc tgtggatgaa gtgatcgatg ccatgtacca agtaggagca 360
agcatgcaaa ctgcctttcg tgaacagct gaaggtggac tcgctaccac cctactgggt 420
cgtgcctccc aaaaagaaat ttctggagaa taa 453

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<210> 216
<211> 197
<212> PRT
<213> Streptococcus pneumoniae

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<400> 216

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Met His Leu Thr His Arg Glu Val Arg Asp Lys Leu Leu Ser Tyr Ser

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1	5	10	15
Glu Gly Leu Gln Val His Tyr Glu Leu Tyr Gln Leu Leu Leu Phe His	20	25	30
Phe Gln Glu Lys Asn Ala Asp His Phe Phe Gly Leu Ile Glu Gln Glu	35	40	45
Leu Pro Thr Val His Pro Leu Phe Gln Thr Val Phe Trp Thr Phe Leu	50	55	60
Arg Asp Arg Asp Lys Ile Ile Asn Ala Leu Lys Leu Pro Tyr Ser Asn	65	70	75
Ala Lys Leu Glu Ala Thr Asn Asn Leu Ile Lys Ile Ile Lys Arg Lys	85	90	95
Ala Phe Gly Phe Arg Asn Phe Asn Asn Phe Lys Lys Arg Ile Leu Met	100	105	110
Thr Leu Asn Ile Lys Lys Glu Ser Thr Asn Phe Val Leu Ser Arg Leu	115	120	125
Gln Leu Phe Ala Tyr Pro Leu His Leu Thr Lys Ser His Ser Leu Phe	130	135	140
His Gly Ile Lys Gly Lys Thr Trp Phe Gly Ile Glu Val Pro Ala Cys	145	150	155
Glu Val Phe Phe Val Pro Leu Ala Asp Ala Gly Ile Gly Asn His Thr	165	170	175
Cys Ile Val Ser Ala Glu Ser Gln Arg Gly Asp Asp Asn Leu Asp Ile	180	185	190
Cys Asp Phe Gly Cys	195		

<210> 217
 <211> 218
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 217

Met Pro Thr Ala Leu Gly Tyr Val Ser Ile Gly Leu Ala Cys Gly Ile
 1 5 10 15

Ile Gly Ala Pro Tyr Val Thr Pro Val Glu Met Gly Leu Met Ser Leu
 20 25 30

Phe Val Tyr Ala Gly Ser Ala Gln Phe Ala Met Leu Ala Leu Ile Val
 35 40 45

Val Gln Ala Pro Val Ala Ala Ile Ala Met Thr Val Phe Leu Ile Asn
 50 55 60

Leu Arg Leu Phe Leu Leu Ser Leu His Ala Ser Thr Tyr Phe Arg His
 65 70 75 80

Thr Ser Leu Trp Tyr Asn Ile Gly Met Ser Ser Ile Leu Thr Asp Glu
 85 90 95

Thr Tyr Gly Val Leu Met Gly Glu Leu Ala His Thr Asp Lys Val Asn
 100 105 110

Pro Met Trp Met His Gly Asn Asn Leu Asn Ser Tyr Val Ala Trp Phe
 115 120 125

Val Gly Thr Val Val Gly Thr Ala Leu Gly Gly Leu Leu Pro Asn Pro
 130 135 140

Glu Ile Phe Gly Leu Asp Phe Ala Leu Val Gly Met Phe Ile Gly Ile
 145 150 155 160

Phe Ala Ser Gln Phe Gln Ile Met Gln Arg Arg Ile Pro Val Arg Asn
 165 170 175

Leu Leu Ile Ile Leu Ala Val Val Ala Val Ser Phe Phe Leu Leu Leu
 180 185 190

Thr Val Met Ser Gln Ser Leu Ala Val Leu Phe Ala Thr Leu Leu Gly
 195 200 205

Cys Ser Met Gly Val Val Leu Asp Gly Gln
 210 215

<210> 218

<211> 276

<212> PRT

<213> Streptococcus pneumoniae

<400> 218

Met Lys Lys Ile Val Lys Tyr Ser Ser Leu Ala Ala Leu Ala Leu Val
 1 5 10 15

Ala Ala Gly Val Leu Ala Ala Cys Ser Gly Gly Ala Lys Lys Glu Gly
 20 25 30

Glu Ala Ala Ser Lys Lys Glu Ile Ile Val Ala Thr Asn Gly Ser Pro
 35 40 45

Lys Pro Phe Ile Tyr Glu Glu Asn Gly Glu Leu Thr Gly Tyr Glu Ile
 50 55 60

Glu Val Val Arg Ala Ile Phe Lys Asp Ser Asp Lys Tyr Asp Val Lys
 65 70 75 80

Phe Glu Lys Thr Glu Trp Ser Gly Val Phe Ala Gly Leu Asp Ala Asp
 85 90 95

Arg Tyr Asn Met Ala Val Asn Asn Leu Ser Tyr Thr Lys Glu Arg Ala
 100 105 110

Glu Lys Tyr Leu Tyr Ala Ala Pro Ile Ala Gln Asn Pro Asn Val Leu
 115 120 125

Val Val Lys Lys Asp Asp Ser Ser Ile Lys Ser Leu Asp Asp Ile Gly
 130 135 140

Gly Lys Ser Thr Glu Val Val Gln Ala Thr Thr Ser Ala Lys Gln Leu
 145 150 155 160

Glu Ala Tyr Asn Ala Glu His Thr Asp Asn Pro Thr Ile Leu Asn Tyr
 165 170 175

Thr Lys Ala Asp Leu Gln Gln Ile Met Val Arg Leu Ser Asp Gly Gln
180 185 190

Phe Asp Tyr Lys Ile Phe Asp Lys Ile Gly Val Glu Thr Val Ile Lys
195 200 205

Asn Gln Gly Leu Asp Asn Leu Lys Val Ile Glu Leu Pro Ser Asp Gln
210 215 220

Gln Pro Tyr Val Tyr Pro Leu Leu Ala Gln Gly Gln Asp Glu Leu Lys
225 230 235 240

Ser Phe Val Asp Lys Arg Ile Lys Glu Leu Tyr Lys Asp Gly Thr Leu
245 250 255

Glu Lys Leu Ser Lys Gln Phe Phe Gly Asp Thr Tyr Leu Pro Ala Glu
260 265 270

Ala Asp Ile Lys
275

<210> 219

<211> 457

<212> PRT

<213> Streptococcus pneumoniae

<400> 219

Met Val Phe Pro Ser Glu Gln Glu Gln Ile Glu Lys Phe Glu Lys Asp
1 5 10 15

His Val Ala Gln His Tyr Phe Glu Val Leu Arg Thr Leu Ile Ser Lys
20 25 30

Lys Ser Val Phe Ala Gln Gln Val Gly Leu Lys Glu Val Ala Asn Tyr
35 40 45

Leu Gly Glu Ile Phe Lys Arg Val Gly Ala Glu Val Glu Ile Asp Glu
50 55 60

Ser Tyr Thr Ala Pro Phe Val Met Ala His Phe Lys Ser Ser Arg Pro
65 70 75 80

Asp Ala Lys Thr Leu Ile Phe Tyr Asn His Tyr Asp Thr Val Pro Ala
 85 90 95

Asp Gly Asp Gln Val Trp Thr Glu Asp Pro Phe Thr Leu Ser Val Arg
 100 105 110

Asn Gly Phe Met Tyr Gly Arg Gly Val Asp Asp Asp Lys Gly His Ile
 115 120 125

Thr Ala Arg Leu Ser Ala Leu Arg Lys Tyr Met Gln His His Asp Asp
 130 135 140

Leu Pro Val Asn Ile Ser Phe Ile Met Glu Gly Ala Glu Glu Ser Ala
 145 150 155 160

Ser Thr Asp Leu Asp Lys Tyr Leu Glu Lys His Ala Asp Lys Leu Arg
 165 170 175

Gly Ala Asp Leu Leu Val Trp Glu Gln Gly Thr Lys Asn Ala Leu Glu
 180 185 190

Gln Leu Glu Ile Ser Gly Gly Asn Lys Gly Ile Val Thr Phe Asp Ala
 195 200 205

Lys Val Lys Ser Ala Asp Val Asp Ile His Ser Ser Tyr Gly Gly Val
 210 215 220

Val Glu Ser Ala Pro Trp Tyr Leu Leu Gln Ala Leu Gln Ser Leu Arg
 225 230 235 240

Ala Ala Asp Gly Arg Ile Leu Val Glu Gly Leu Tyr Glu Glu Val Gln
 245 250 255

Glu Pro Asn Glu Arg Glu Met Ala Leu Leu Glu Thr Tyr Gly Gln Arg
 260 265 270

Asn Pro Glu Glu Val Ser Arg Ile Tyr Gly Leu Glu Leu Pro Leu Leu
 275 280 285

Gln Glu Glu Arg Met Ala Phe Leu Lys Arg Phe Phe Phe Asp Pro Ala
 290 295 300

Leu Asn Ile Glu Gly Ile Gln Ser Gly Tyr Gln Gly Gln Gly Val Lys
 305 310 315 320

Thr Ile Leu Pro Ala Glu Ala Ser Ala Lys Leu Glu Val Arg Leu Val
 325 330 335

Pro Gly Leu Glu Pro His Asp Val Leu Glu Lys Ile Arg Lys Gln Leu
 340 345 350

Asp Lys Asn Gly Phe Asp Lys Val Glu Leu Tyr Tyr Thr Leu Gly Glu
 355 360 365

Met Ser Tyr Arg Ser Asp Met Ser Ala Pro Ala Ile Leu Asn Val Ile
 370 375 380

Glu Leu Ala Lys Lys Phe Tyr Pro Gln Gly Val Ser Val Leu Pro Thr
 385 390 395 400

Thr Ala Gly Thr Gly Pro Met His Thr Val Phe Asp Ala Leu Glu Val
 405 410 415

Pro Met Val Ala Phe Gly Leu Gly Asn Ala Asn Ser Arg Asp His Gly
 420 425 430

Gly Asp Glu Asn Val Arg Ile Ala Asp Tyr Tyr Thr His Ile Glu Leu
 435 440 445

Val Glu Glu Leu Ile Arg Ser Tyr Glu
 450 455

<210> 220

<211> 204

<212> PRT

<213> Streptococcus pneumoniae

<400> 220

Met Gly Arg Phe Leu Asp Phe Val Phe Asn Arg Phe Phe Leu Gly Met
 1 5 10 15

Ile Ala Thr Ala Phe Phe Trp Leu Leu Thr Leu Ala Gly Gly Ile Ile
 20 25 30

Leu Gly Leu Ala Pro Ala Ser Ala Thr Leu Met Ser Leu Tyr Ala Glu
 35 40 45

His Gly Tyr Ser Phe Arg Glu Tyr Ser Leu Lys Glu Ala Trp Ser Leu
 50 55 60

Tyr Lys Gln Asn Phe Val Ser Ser Asn Leu Ile Phe Tyr Ser Phe Leu
 65 70 75 80

Gly Val Gly Leu Val Leu Thr Tyr Gly Leu Tyr Leu Leu Val Gln Leu
 85 90 95

Pro His Gln Thr Ile Val His Leu Ile Ala Thr Leu Leu Asn Val Leu
 100 105 110

Val Val Ala Leu Ile Phe Leu Ala Tyr Thr Val Ser Leu Lys Leu Gln
 115 120 125

Val Tyr Phe Ala Leu Ser Tyr Arg Asn Ser Leu Lys Leu Ser Leu Ile
 130 135 140

Gly Ile Phe Met Ser Leu Ala Ala Val Ala Lys Val Leu Leu Gly Thr
 145 150 155 160

Val Leu Leu Val Ala Ile Gly Tyr Tyr Met Pro Ala Leu Leu Phe Phe
 165 170 175

Val Gly Ile Gly Met Trp His Phe Phe Ile Ser Asp Met Leu Glu Pro
 180 185 190

Val Tyr Glu Ile Ile His Glu Lys Leu Ala Thr Lys
 195 200

<210> 221

<211> 152

<212> PRT

<213> Streptococcus pneumoniae

<400> 221

Met Lys Lys Gln Val Phe His Asp Ala Ala Thr Gly Val Leu Ile Gly
 1 5 10 15

Leu Ile Leu Ser Ile Leu Phe Ser Leu Ile Tyr Ala Pro Asn Thr Tyr
 20 25 30

Ala Pro Leu Asn Pro Tyr Ser Leu Ile Gly Gln Val Met Asp Gln His
 35 40 45

Gln Val His Gly Ala Leu Val Leu Leu Tyr Cys Thr Leu Ile Trp Ala
 50 55 60

Thr Ile Gly Met Leu Phe Asn Phe Gly Asn Arg Leu Phe Ser Arg Asp
 65 70 75 80

Trp Ser Met Leu Arg Ala Thr Leu Thr His Phe Phe Leu Met Leu Ala
 85 90 95

Gly Phe Val Pro Leu Ala Thr Leu Ala Gly Trp Phe Pro Phe His Trp
 100 105 110

Ile Phe Tyr Leu Gln Leu Ile Ile Glu Phe Ala Ile Val Tyr Leu Ile
 115 120 125

Ile Trp Ala Ile Leu Tyr Lys Arg Glu Ala Lys Lys Val Asp His Ile
 130 135 140

Asn Gln Leu Leu Glu His Arg Lys
 145 150

<210> 222
 <211> 197
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 222

Met Tyr Ala Tyr Leu Lys Gly Ile Ile Thr Lys Ile Thr Ala Lys Tyr
 1 5 10 15

Ile Val Leu Glu Thr Asn Gly Ile Gly Tyr Ile Leu His Val Ala Asn
 20 25 30

Pro Tyr Ala Tyr Ser Gly Gln Val Asn Gln Glu Ala Gln Ile Tyr Val
 35 40 45

His Gln Val Val Arg Glu Asp Ala His Leu Leu Tyr Gly Phe Arg Ser
50 55 60

Glu Asp Glu Lys Lys Leu Phe Leu Ser Leu Ile Ser Val Ser Gly Ile
65 70 75 80

Gly Pro Val Ser Ala Leu Ala Ile Ile Ala Ala Asp Asp Asn Ala Gly
85 90 95

Leu Val Gln Ala Ile Glu Thr Lys Asn Ile Thr Tyr Leu Thr Lys Phe
100 105 110

Pro Lys Ile Gly Lys Lys Thr Ala Gln Gln Met Val Leu Asp Leu Glu
115 120 125

Gly Lys Val Val Val Ala Gly Asp Asp Leu Pro Ala Lys Val Ala Val
130 135 140

Gln Ala Ser Ala Glu Asn Gln Glu Leu Glu Glu Ala Met Glu Ala Met
145 150 155 160

Leu Ala Leu Gly Tyr Lys Ala Thr Glu Leu Lys Lys Ile Lys Lys Phe
165 170 175

Phe Glu Gly Thr Thr Asp Thr Ala Glu Asn Tyr Ile Lys Ser Ala Leu
180 185 190

Lys Met Leu Val Lys
195

<210> 223

<211> 189

<212> PRT

<213> Streptococcus pneumoniae

<400> 223

Met Lys Lys Ile Val Leu Val Ser Leu Ala Phe Leu Phe Val Leu Val
1 5 10 15

Gly Cys Gly Gln Lys Lys Glu Thr Gly Pro Ala Thr Lys Thr Glu Lys
20 25 30

Asp Thr Leu Gln Ser Ala Leu Pro Val Ile Glu Asn Ala Glu Lys Asn
 35 40 45

Thr Val Val Thr Lys Thr Leu Val Leu Pro Lys Ser Asp Asp Gly Ser
 50 55 60

Gln Gln Thr Gln Thr Ile Thr Tyr Lys Asp Lys Thr Phe Leu Ser Leu
 65 70 75 80

Ala Ile Gln Gln Lys Arg Pro Val Ser Asp Glu Leu Lys Thr Tyr Ile
 85 90 95

Asp Gln His Gly Val Glu Glu Thr Gln Lys Ala Leu Leu Glu Ala Glu
 100 105 110

Glu Lys Asp Lys Ser Ile Ile Glu Ala Arg Lys Leu Ala Gly Phe Lys
 115 120 125

Leu Glu Thr Lys Leu Leu Ser Ala Thr Glu Leu Gln Thr Thr Thr Ser
 130 135 140

Phe Asp Phe Gln Val Leu Asp Val Lys Lys Ala Ser Gln Leu Glu His
 145 150 155 160

Leu Lys Asn Ile Gly Leu Glu Asn Leu Leu Lys Asn Glu Pro Ser Lys
 165 170 175

Tyr Ile Ser Asp Arg Leu Ala Asn Gly Ala Thr Glu Gln
 180 185

<210> 224

<211> 152

<212> PRT

<213> Streptococcus pneumoniae

<400> 224

Met Lys Leu Lys Arg Phe Thr Leu Ser Leu Ala Ser Leu Ala Ser Phe
 1 5 10 15

Ser Leu Leu Val Ala Cys Ser Gln Arg Ala Gln Gln Val Gln Gln Pro
 20 25 30

Val Ala Gln Gln Gln Val Gln Gln Pro Ala Gln Gln Asn Thr Asn Thr
 35 40 45

Ala Asn Ala Gly Gly Asn Gln Asn Gln Ala Ala Pro Val Gln Asn Gln
 50 55 60

Pro Val Ala Gln Pro Thr Asp Ile Asp Gly Thr Tyr Thr Gly Gln Asp
 65 70 75 80

Asp Gly Asp Arg Ile Thr Leu Val Val Thr Gly Thr Thr Gly Thr Trp
 85 90 95

Thr Glu Leu Glu Ser Asp Gly Asp Gln Lys Val Lys Gln Val Thr Leu
 100 105 110

Asp Ser Ala Asn Gln Arg Met Ile Ile Gly Asp Asp Val Lys Ile Tyr
 115 120 125

Thr Val Asn Gly Asn Gln Ile Val Val Asp Asp Met Asp Arg Asp Pro
 130 135 140

Ser Asp Gln Ile Val Leu Thr Lys
 145 150

<210> 225
 <211> 510
 <212> FRT
 <213> Streptococcus pneumoniae

<400> 225

Met Lys Tyr Arg Lys Phe Gln Leu Leu Met Ser Lys Tyr Gly Phe Ser
 1 5 10 15

Leu Ser Ile Met Leu Leu Glu Leu Cys Leu Val Phe Gly Leu Phe Leu
 20 25 30

Tyr Leu Gly Arg Met Ala Pro Ile Leu Trp Ile Thr Val Leu Ile Leu
 35 40 45

Leu Ser Ile Ile Thr Ile Ile Ser Ile Val Asn Arg Asn Thr Thr Pro
 50 55 60

Glu Asn Lys Val Thr Trp Leu Leu Val Ala Phe Val Pro Val Phe Gly
 65 70 75 80
 Pro Leu Leu Tyr Leu Met Phe Gly Glu Arg Arg Leu Ser Lys Lys Glu
 85 90 95
 Ile Lys Gln Leu Lys Lys Leu Gly Ser Met His Phe Gln Glu Ala Asn
 100 105 110
 Ser Gln Leu Leu Lys Glu Lys Leu Lys Glu Ser Asp Lys Ala Ala Tyr
 115 120 125
 Gly Val Ile Lys Ser Leu Leu Ser Met Asp Thr Asn Ala Asp Ile Tyr
 130 135 140
 Asp Gln Thr Ala Ser Thr Phe Phe Pro Asn Gly Glu Ala Met Trp Lys
 145 150 155 160
 Lys Met Val Glu Asp Leu Lys Lys Ala Glu Lys Phe Ile Phe Leu Glu
 165 170 175
 Tyr Tyr Ile Ile Glu Glu Gly Leu Met Trp Asn Arg Ile Leu Asp Ile
 180 185 190
 Leu Glu Gln Lys Val Ala Gln Gly Val Glu Val Lys Met Leu Tyr Asp
 195 200 205
 Asp Ile Gly Cys Met Ala Thr Leu Thr Gly Asp Tyr Ala His Arg Leu
 210 215 220
 Arg Gln Leu Gly Ile Glu Ala His Lys Phe Asn Lys Val Ile Pro Arg
 225 230 235 240
 Leu Thr Val Ala Tyr Asn Asn Arg Asp His Arg Lys Ile Leu Ile Val
 245 250 255
 Asp Gly Gln Ile Ala Tyr Thr Gly Gly Val Asn Leu Ala Asp Glu Tyr
 260 265 270
 Ile Asn His Val Glu Arg Phe Gly Tyr Trp Lys Asp Ser Gly Ile Arg
 275 280 285

Leu Asp Gly Leu Ala Val Lys Ala Leu Thr Arg Leu Phe Leu Thr Thr
 290 295 300

Trp Tyr Ile Asn Arg Gly Glu Ile Ser Asp Phe Asp Gln Tyr His Leu
 305 310 315 320

Glu Asn His Ser Ile Pro Ser Asp Gly Leu Thr Ile Pro Tyr Gly Ser
 325 330 335

Gly Pro Lys Pro Ile Phe Arg Ala Gln Val Gly Lys Lys Val Tyr Gln
 340 345 350

Ser Leu Ile Asn Gln Ala Thr Glu Ser Val Tyr Ile Thr Thr Pro Tyr
 355 360 365

Leu Ile Ile Asp Tyr Asp Leu Thr Glu Thr Ile Lys Asn Ala Ala Met
 370 375 380

Arg Gly Val Asp Val Arg Ile Ile Thr Pro Tyr Ile Pro Asp Lys Lys
 385 390 395 400

Phe Ile Gln Leu Val Thr Arg Gly Ala Tyr Pro Asp Leu Leu Ser Ala
 405 410 415

Gly Val Arg Ile Tyr Glu Tyr Ser Pro Gly Phe Ile His Ser Lys Gln
 420 425 430

Met Leu Val Asp Glu Asp Phe Ala Val Val Gly Thr Ile Asn Leu Asp
 435 440 445

Tyr Arg Ser Leu Val His His Tyr Glu Asn Ala Val Leu Leu Tyr Lys
 450 455 460

Thr Pro Ser Ile Arg Glu Ile Ala Arg Asp Phe Arg Asn Ile Phe Ala
 465 470 475 480

Asp Ser Gln Glu Val Tyr Pro His Ser Ile Lys Thr Ser Trp Tyr Gln
 485 490 495

Lys Leu Val Lys Glu Ile Ala Gln Leu Phe Ala Pro Ile Leu

500 505 510

<210> 226
 <211> 81
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 226

Met Asn Gln Thr Phe Gly Thr Val Val Ser Asn Asp Trp Phe Ser Leu
 1 5 10 15

Ser Asn Ile Asn Ile Gln Thr Thr Phe Tyr Cys Leu Arg Leu Ile Ile
 20 25 30

Phe Thr Leu Val Val Ile Phe Phe Phe Ile Val Asn Trp Trp Val Lys
 35 40 45

Asp Leu Val Glu Ser Phe Ser Ser Tyr Ala Val Asp Asp Thr Pro Thr
 50 55 60

Gln Thr Phe Gln Lys Ala Val Arg Val His Phe Asn Ile Asp Asn Thr
 65 70 75 80

Phe

<210> 227
 <211> 490
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 227

Met Ile Asn Asp Ile Ile Leu Leu Leu Phe Val Lys Ile Lys Arg Arg
 1 5 10 15

Leu Met Met Asp Lys Leu Phe Lys Leu Lys Glu Asn Gly Thr Asp Val
 20 25 30

Arg Thr Glu Val Leu Ala Gly Leu Thr Thr Phe Phe Ala Met Ser Tyr
 35 40 45

Ile Leu Phe Val Asn Pro Gln Ile Leu Ser Gln Thr Gly Met Pro Ala
 50 55 60

Gln Gly Val Phe Leu Ala Thr Ile Ile Gly Ala Val Ala Gly Thr Leu
 65 70 75 80
 Met Met Ala Phe Tyr Ala Asn Leu Pro Tyr Ala Gln Ala Pro Gly Met
 85 90 95
 Gly Leu Asn Ala Phe Phe Thr Phe Thr Val Val Phe Gly Leu Gly Tyr
 100 105 110
 Ser Trp Gln Glu Ala Leu Ala Met Val Phe Ile Cys Gly Ile Ile Ser
 115 120 125
 Leu Ile Ile Thr Leu Thr Asn Val Arg Lys Met Ile Ile Glu Ser Ile
 130 135 140
 Pro Asn Ala Leu Arg Ser Ala Ile Ser Ala Gly Ile Gly Val Phe Leu
 145 150 155 160
 Ala Tyr Val Gly Ile Lys Asn Ala Gly Leu Leu Lys Phe Thr Ile Asp
 165 170 175
 Pro Gly Asn Tyr Thr Val Val Gly Glu Gly Ala Asp Lys Ala Gln Ala
 180 185 190
 Thr Ile Ala Ala Asn Ser Ser Ala Val Pro Gly Leu Val Ser Phe Asn
 195 200 205
 Asn Pro Ala Val Leu Val Ala Leu Ala Gly Leu Ala Ile Thr Ile Phe
 210 215 220
 Phe Val Ile Lys Gly Ile Lys Gly Gly Ile Ile Leu Ser Ile Leu Thr
 225 230 235 240
 Thr Thr Val Leu Ala Ile Ala Val Gly Leu Val Asp Leu Ser Ser Ile
 245 250 255
 Asp Phe Ala Asn Asn His Val Gly Ala Ala Phe Glu Asp Leu Lys Thr
 260 265 270
 Ile Phe Gly Ala Ala Leu Gly Ser Glu Gly Leu Gly Ala Leu Val Ser

275	280	285
Asp Thr Ala Arg Leu Pro Glu Thr Leu Met Ala Ile Leu Ala Phe Ser		
290	295	300
Leu Thr Asp Ile Phe Asp Thr Ile Gly Thr Leu Ile Gly Thr Gly Glu		
305	310	315
Lys Val Gly Ile Val Ala Thr Asn Gly Glu Asn His Gln Ser Ala Lys		
325	330	335
Leu Asp Lys Ala Leu Tyr Ser Asp Leu Ile Gly Thr Thr Val Gly Ala		
340	345	350
Ile Ala Gly Thr Ser Asn Val Thr Thr Tyr Val Glu Ser Ala Ala Gly		
355	360	365
Ile Gly Ala Gly Gly Arg Thr Gly Leu Thr Ala Leu Val Val Ala Ile		
370	375	380
Cys Phe Ala Ile Ser Ser Phe Phe Ser Pro Leu Leu Ala Ile Val Pro		
385	390	395
Thr Ala Ala Thr Ala Pro Ile Leu Ile Ile Val Gly Ile Met Met Leu		
405	410	415
Gly Ser Leu Lys Asn Ile His Trp Asp Asp Met Ser Glu Ala Val Pro		
420	425	430
Ala Phe Phe Thr Ser Ile Phe Met Gly Phe Ser Tyr Ser Ile Thr Gln		
435	440	445
Gly Ile Ala Val Gly Phe Leu Thr Tyr Thr Leu Thr Lys Leu Val Lys		
450	455	460
Gly Gln Val Lys Asp Val His Val Met Ile Trp Ile Leu Asp Ala Leu		
465	470	475
Phe Ile Leu Asn Tyr Ile Ser Met Ala Leu		
485	490	

<210> 228
 <211> 1077
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 228

Met Ile Leu Gln Tyr Val Tyr Trp Ser Val Tyr Met Gln Thr Lys Thr
 1 5 10 15

Lys Lys Leu Ile Val Ser Leu Ser Ser Leu Val Leu Ser Gly Phe Leu
 20 25 30

Leu Asn His Tyr Met Thr Ile Gly Ala Glu Glu Thr Thr Thr Asn Thr
 35 40 45

Ile Gln Gln Ser Gln Lys Glu Val Gln Tyr Gln Gln Arg Asp Thr Lys
 50 55 60

Asn Leu Val Glu Asn Gly Asp Phe Gly Gln Thr Glu Asp Gly Ser Ser
 65 70 75 80

Pro Trp Thr Gly Ser Lys Ala Gln Gly Trp Ser Ala Trp Val Asp Gln
 85 90 95

Lys Asn Ser Ala Asp Ala Ser Thr Arg Val Ile Glu Ala Lys Asp Gly
 100 105 110

Ala Ile Thr Ile Ser Ser His Glu Lys Leu Arg Ala Ala Leu His Arg
 115 120 125

Met Val Pro Ile Glu Ala Lys Lys Lys Tyr Lys Leu Arg Phe Lys Ile
 130 135 140

Lys Thr Asp Asn Lys Ile Gly Ile Ala Lys Val Arg Ile Ile Glu Glu
 145 150 155 160

Ser Gly Lys Asp Lys Arg Leu Trp Asn Ser Ala Thr Thr Ser Gly Thr
 165 170 175

Lys Asp Trp Gln Thr Ile Glu Ala Asp Tyr Ser Pro Thr Leu Asp Val
 180 185 190

Asp Lys Ile Lys Leu Glu Leu Phe Tyr Glu Thr Gly Thr Gly Thr Val
 195 200 205
 Ser Phe Lys Asp Ile Glu Leu Val Glu Val Ala Asp Gln Leu Ser Glu
 210 215 220
 Asp Ser Gln Thr Asp Lys Gln Leu Glu Glu Lys Ile Asp Leu Pro Ile
 225 230 235 240
 Gly Lys Lys His Val Phe Ser Leu Ala Asp Tyr Thr Tyr Lys Val Glu
 245 250 255
 Asn Pro Asp Val Ala Ser Val Lys Asn Gly Ile Leu Glu Pro Leu Lys
 260 265 270
 Glu Gly Thr Thr Asn Val Ile Val Ser Lys Asp Gly Lys Glu Val Lys
 275 280 285
 Lys Ile Pro Leu Lys Ile Leu Ala Ser Val Lys Asp Ala Tyr Thr Asp
 290 295 300
 Arg Leu Asp Asp Trp Asn Gly Ile Ile Ala Gly Asn Gln Tyr Tyr Asp
 305 310 315 320
 Ser Lys Asn Glu Gln Met Ala Lys Leu Asn Gln Glu Leu Glu Gly Lys
 325 330 335
 Val Ala Asp Ser Leu Ser Ser Ile Ser Ser Gln Ala Asp Arg Thr Tyr
 340 345 350
 Leu Trp Glu Lys Phe Ser Asn Tyr Lys Thr Ser Ala Asn Leu Thr Ala
 355 360 365
 Thr Tyr Arg Lys Leu Glu Glu Met Ala Lys Gln Val Thr Asn Pro Ser
 370 375 380
 Ser Arg Tyr Tyr Gln Asp Glu Thr Val Val Arg Thr Val Arg Asp Ser
 385 390 395 400
 Met Glu Trp Met His Lys His Val Tyr Asn Ser Glu Lys Ser Ile Val
 405 410 415

Gly Asn Trp Trp Asp Tyr Glu Ile Gly Thr Pro Arg Ala Ile Asn Asn
 420 425 430
 Thr Leu Ser Leu Met Lys Glu Tyr Phe Ser Asp Glu Glu Ile Lys Lys
 435 440 445
 Tyr Thr Asp Val Ile Glu Lys Phe Val Pro Asp Pro Glu His Phe Arg
 450 455 460
 Lys Thr Thr Asp Asn Pro Phe Lys Ala Leu Gly Gly Asn Leu Val Asp
 465 470 475 480
 Met Gly Arg Val Lys Val Ile Ala Gly Leu Leu Arg Lys Asp Asp Gln
 485 490 495
 Glu Ile Ser Ser Thr Ile Arg Ser Ile Glu Gln Val Phe Lys Leu Val
 500 505 510
 Asp Gln Gly Glu Gly Phe Tyr Gln Asp Gly Ser Tyr Ile Asp His Thr
 515 520 525
 Asn Val Ala Tyr Thr Gly Ala Tyr Gly Asn Val Leu Ile Asp Gly Leu
 530 535 540
 Ser Gln Leu Leu Pro Val Ile Gln Lys Thr Lys Asn Pro Ile Asp Lys
 545 550 555 560
 Asp Lys Met Gln Thr Met Tyr His Trp Ile Asp Lys Ser Phe Ala Pro
 565 570 575
 Leu Leu Val Asn Gly Glu Leu Met Asp Met Ser Arg Gly Arg Ser Ile
 580 585 590
 Ser Arg Ala Asn Ser Glu Gly His Val Ala Ala Val Glu Val Leu Arg
 595 600 605
 Gly Ile His Arg Ile Ala Asp Met Ser Glu Gly Glu Thr Lys Gln Cys
 610 615 620
 Leu Gln Ser Leu Val Lys Thr Ile Val Gln Ser Asp Ser Tyr Tyr Asp
 625 630 635 640

Val Phe Lys Asn Leu Lys Thr Tyr Lys Asp Ile Ser Leu Met Gln Ser
 645 650 655

Leu Leu Ser Asp Ala Gly Val Ala Ser Val Pro Arg Pro Ser Tyr Leu
 660 665 670

Ser Ala Phe Asn Lys Met Asp Lys Thr Ala Met Tyr Asn Ala Glu Lys
 675 680

Gly Phe Gly Phe Gly Leu Ser Leu Phe Ser Ser Arg Thr Leu Asn Tyr
 690 695 700

Glu His Met Asn Lys Glu Asn Lys Arg Gly Trp Tyr Thr Ser Asp Gly
 705 710 715 720

Met Phe Tyr Leu Tyr Asn Gly Asp Leu Ser His Tyr Ser Asp Gly Tyr
 725 730 735

Trp Pro Thr Val Asn Pro Tyr Lys Met Pro Gly Thr Thr Glu Thr Asp
 740 745 750

Ala Lys Arg Ala Asp Ser Asp Thr Gly Lys Val Leu Pro Ser Ala Phe
 755 760 765

Val Gly Thr Ser Lys Leu Asp Asp Ala Asn Ala Thr Ala Thr Met Asp
 770 775 780

Phe Thr Asn Trp Asn Gln Thr Leu Thr Ala His Lys Ser Trp Phe Met
 785 790 795 800

Leu Lys Asp Lys Ile Ala Phe Leu Gly Ser Asn Ile Gln Asn Thr Ser
 805 810 815

Thr Asp Thr Ala Ala Thr Thr Ile Asp Gln Arg Lys Leu Glu Ser Gly
 820 825 830

Asn Pro Tyr Lys Val Tyr Val Asn Asp Lys Glu Ala Ser Leu Thr Glu
 835 840 845

Gln Glu Lys Asp Tyr Pro Glu Thr Gln Ser Val Phe Leu Glu Ser Phe

850	855	860
Asp Ser Lys Lys Asn Ile Gly Tyr Phe Phe Phe Lys Lys Ser Ser Ile		
865	870	875 880
Ser Met Ser Lys Ala Leu Gln Lys Gly Ala Trp Lys Asp Ile Asn Glu		
	885	890 895
Gly Gln Ser Asp Lys Glu Val Glu Asn Glu Phe Leu Thr Ile Ser Gln		
	900	905 910
Ala His Lys Gln Asn Arg Asp Ser Tyr Gly Tyr Met Leu Ile Pro Asn		
	915	920 925
Val Asp Arg Ala Thr Phe Asn Gln Met Ile Lys Glu Leu Glu Ser Ser		
	930	935 940
Leu Ile Glu Asn Asn Glu Thr Leu Gln Ser Val Tyr Asp Ala Lys Gln		
	945	950 955 960
Gly Val Trp Gly Ile Val Lys Tyr Asp Asp Ser Val Ser Thr Ile Ser		
	965	970 975
Asn Gln Phe Gln Val Leu Lys Arg Gly Val Tyr Thr Ile Arg Lys Glu		
	980	985 990
Gly Asp Glu Tyr Lys Ile Ala Tyr Tyr Asn Pro Glu Thr Gln Glu Ser		
	995	1000 1005
Ala Pro Asp Gln Glu Val Phe Lys Lys Leu Glu Gln Ala Ala Gln		
	1010	1015 1020
Pro Gln Val Gln Asn Ser Lys Glu Lys Glu Lys Ser Glu Glu Glu		
	1025	1030 1035
Lys Asn His Ser Asp Gln Lys Asn Leu Pro Gln Thr Gly Glu Gly		
	1040	1045 1050
Gln Ser Ile Leu Ala Ser Leu Gly Phe Leu Leu Leu Gly Ala Phe		
	1055	1060 1065

Tyr Leu Phe Arg Arg Gly Lys Asn Asn
 1070 1075

<210> 229

<211> 259

<212> PRT

<213> Streptococcus pneumoniae

<400> 229

Met Ser Ile Asn Val Phe Gln Ala Ile Leu Ile Gly Leu Trp Thr Ala
 1 5 10 15

Phe Cys Phe Ser Gly Met Leu Leu Gly Ile Tyr Thr Asn Arg Cys Ile
 20 25 30

Val Leu Ser Phe Gly Val Gly Ile Ile Leu Gly Asp Leu Pro Thr Ala
 35 40 45

Leu Ala Met Gly Ala Ile Gly Glu Leu Ala Tyr Met Gly Phe Gly Val
 50 55 60

Gly Ala Gly Gly Thr Val Pro Pro Asn Pro Ile Gly Pro Gly Ile Phe
 65 70 75 80

Gly Thr Leu Met Ala Ile Thr Ser Ala Gly Lys Val Ser Pro Glu Ala
 85 90 95

Ala Leu Ala Leu Ser Thr Pro Ile Ala Val Ala Ile Gln Phe Leu Gln
 100 105 110

Thr Phe Ala Tyr Thr Val Arg Ala Gly Ala Pro Glu Thr Ala Met Lys
 115 120 125

His Leu Lys Asn His Asn Leu Lys Lys Phe Lys Phe Thr Leu Asn Ala
 130 135 140

Thr Ile Trp Leu Phe Ala Phe Ile Gly Phe Thr Leu Gly Cys Leu Gly
 145 150 155 160

Ala Leu Ser Met Asp Thr Leu Leu Lys Leu Val Asp Tyr Ile Pro Pro
 165 170 175

Val Leu Leu Thr Gly Leu Thr Val Ala Gly Lys Met Leu Pro Ala Ile
 180 185 190

Gly Phe Ala Met Ile Leu Ser Val Met Ala Lys Lys Glu Leu Ile Pro
 195 200 205

Phe Val Leu Leu Gly Tyr Val Cys Ala Ala Tyr Leu Asn Ile Pro Thr
 210 215 220

Ile Gly Ile Ala Ile Val Gly Thr Ile Phe Ala Leu Ile Glu Phe Tyr
 225 230 235 240

Asn Lys Pro Lys Thr Ala Asp His Val Val Glu Glu Ala His Asp
 245 250 255

Asp Trp Ile

<210> 230
 <211> 111
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 230

Met Lys Ser Leu Ala Arg Leu Leu Ile Ile His Val Phe Ile Ser Ile
 1 5 10 15

Phe Leu Phe Phe Ala Leu Thr Ser Gly Ala Ile Ser His Thr Val Leu
 20 25 30

Leu Leu Leu Leu Leu Phe Leu Pro Ala Leu Asn Lys Gly Leu Glu Lys
 35 40 45

Ile Gln Ser Lys Arg Ile Pro Val Leu Asn Ala Ala Leu Phe Phe Leu
 50 55 60

Leu Ile Ser Phe Pro Gln Leu Leu Thr Asn Pro Val Gln Trp Lys Phe
 65 70 75 80

Ser Ile Phe Leu Val Val Thr Ile Ile Ser Ser Leu Ala Tyr Phe Tyr
 85 90 95

Asn Phe Tyr Gln Val Val Lys Glu Val Asp Gln Lys Gln Leu Ile
 100 105 110

<210> 231

<211> 750

<212> PRT

<213> Streptococcus pneumoniae

<400> 231

Met Lys Trp Thr Lys Arg Val Ile Arg Tyr Ala Thr Lys Asn Arg Lys
 1 5 10 15

Ser Pro Ala Glu Asn Arg Arg Arg Val Gly Lys Ser Leu Ser Leu Leu
 20 25 30

Ser Val Phe Val Phe Ala Ile Phe Leu Val Asn Phe Ala Val Ile Ile
 35 40 45

Gly Thr Gly Thr Arg Phe Gly Thr Asp Leu Ala Lys Glu Ala Lys Lys
 50 55 60

Val His Gln Thr Thr Arg Thr Val Pro Ala Lys Arg Gly Thr Ile Tyr
 65 70 75 80

Asp Arg Asn Gly Val Pro Ile Ala Glu Asp Ala Thr Ser Tyr Asn Val
 85 90 95

Tyr Ala Val Ile Asp Glu Asn Tyr Lys Ser Ala Thr Gly Lys Ile Leu
 100 105 110

Tyr Val Glu Lys Thr Gln Phe Asn Lys Val Ala Glu Val Phe His Lys
 115 120 125

Tyr Leu Asp Met Glu Glu Ser Tyr Val Arg Glu Gln Leu Ser Gln Pro
 130 135 140

Asn Leu Lys Gln Val Ser Phe Gly Ala Lys Gly Asn Gly Ile Thr Tyr
 145 150 155 160

Ala Asn Met Met Ser Ile Lys Lys Glu Leu Glu Ala Ala Glu Val Lys
 165 170 175

Gly Ile Asp Phe Thr Thr Ser Pro Asn Arg Ser Tyr Pro Asn Gly Gln
 180 185 190

Phe Ala Ser Ser Phe Ile Gly Leu Ala Gln Leu His Glu Asn Glu Asp
 195 200 205

Gly Ser Lys Ser Leu Leu Gly Thr Ser Gly Met Glu Ser Ser Leu Asn
 210 215 220

Ser Ile Leu Ala Gly Thr Asp Gly Ile Ile Thr Tyr Glu Lys Asp Arg
 225 230 235 240

Leu Gly Asn Ile Val Pro Gly Thr Glu Gln Val Ser Gln Arg Thr Met
 245 250 255

Asp Gly Lys Asp Val Tyr Thr Thr Ile Ser Ser Pro Leu Gln Ser Phe
 260 265 270

Met Glu Thr Gln Met Asp Ala Phe Gln Glu Lys Val Lys Gly Lys Tyr
 275 280 285

Met Thr Ala Thr Leu Val Ser Ala Lys Thr Gly Glu Ile Leu Ala Thr
 290 295 300

Thr Gln Arg Pro Thr Phe Asp Ala Asp Thr Lys Glu Gly Ile Thr Glu
 305 310 315 320

Asp Phe Val Trp Arg Asp Ile Leu Tyr Gln Ser Asn Tyr Glu Pro Gly
 325 330 335

Ser Thr Met Lys Val Met Met Leu Ala Ala Ile Asp Asn Asn Thr
 340 345 350

Phe Pro Gly Gly Glu Val Phe Asn Ser Ser Glu Leu Lys Ile Ala Asp
 355 360 365

Ala Thr Ile Arg Asp Trp Asp Val Asn Glu Gly Leu Thr Gly Gly Arg
 370 375 380

Thr Met Thr Phe Ser Gln Gly Phe Ala His Ser Ser Asn Val Gly Met
 385 390 395 400

Thr Leu Leu Glu Gln Lys Met Gly Asp Ala Thr Trp Leu Asp Tyr Leu
 405 410 415
 Asn Arg Phe Lys Phe Gly Val Pro Thr Arg Phe Gly Leu Thr Asp Glu
 420 425 430
 Tyr Ala Gly Gln Leu Pro Ala Asp Asn Ile Val Asn Ile Ala Gln Ser
 435 440 445
 Ser Phe Gly Gln Gly Ile Ser Val Thr Gln Thr Gln Met Ile Arg Ala
 450 455 460
 Phe Thr Ala Ile Ala Asn Asp Gly Val Met Leu Glu Pro Lys Phe Ile
 465 470 475 480
 Ser Ala Ile Tyr Asp Pro Asn Asp Gln Thr Ala Arg Lys Ser Gln Lys
 485 490 495
 Glu Ile Val Gly Asn Pro Val Ser Lys Asp Ala Ala Ser Leu Thr Arg
 500 505 510
 Thr Asn Met Val Leu Val Gly Thr Asp Pro Val Tyr Gly Thr Met Tyr
 515 520 525
 Asn His Ser Thr Gly Lys Pro Thr Val Thr Val Pro Gly Gln Asn Val
 530 535 540
 Ala Leu Lys Ser Gly Thr Ala Gln Ile Ala Asp Glu Lys Asn Gly Gly
 545 550 555 560
 Tyr Leu Val Gly Leu Thr Asp Tyr Ile Phe Ser Ala Val Ser Met Ser
 565 570 575
 Pro Ala Glu Asn Pro Asp Phe Ile Leu Tyr Val Thr Val Gln Gln Pro
 580 585 590
 Glu His Tyr Ser Gly Ile Gln Leu Gly Glu Phe Ala Asn Pro Ile Leu
 595 600 605
 Glu Arg Ala Ser Ala Met Lys Asp Ser Leu Asn Leu Gln Thr Thr Ala
 610 615 620

Lys Ala Leu Glu Gln Val Ser Gln Gln Ser Pro Tyr Pro Met Pro Ser
625 630 635 640

Val Lys Asp Ile Ser Pro Gly Asp Leu Ala Glu Glu Leu Arg Arg Asn
645 650 655

Leu Val Gln Pro Ile Val Val Gly Thr Gly Thr Lys Ile Lys Asn Ser
660 665 670

Ser Ala Glu Glu Gly Lys Asn Leu Ala Pro Asn Gln Gln Val Leu Ile
675 680 685

Leu Ser Asp Lys Ala Glu Glu Val Pro Asp Met Tyr Gly Trp Thr Lys
690 695 700

Glu Thr Ala Glu Thr Leu Ala Lys Trp Leu Asn Ile Glu Leu Glu Phe
705 710 715 720

Gln Gly Ser Gly Ser Thr Val Gln Lys Gln Asp Val Arg Ala Asn Thr
725 730 735

Ala Ile Lys Asp Ile Lys Lys Ile Thr Leu Thr Leu Gly Asp
740 745 750

<210> 232
<211> 217
<212> PRT
<213> Streptococcus pneumoniae

<400> 232

Met Ser Asn Gly Asn Arg Met Lys Asn Gly Asn Arg Ile Tyr Ser Trp
1 5 10 15

Arg Leu Phe Met Tyr Gly Ile Ile Lys Arg Leu Gly Asp Ile Leu Leu
20 25 30

Ser Leu Ile Gly Ile Ile Ile Leu Cys Pro Val Phe Met Ile Ile Ala
35 40 45

Ile Ala Ile Lys Leu Asp Ser Glu Gly Pro Val Ile Phe Lys Gln Lys
50 55 60

Arg Phe Gly Ile His Lys Glu Tyr Phe Tyr Ile Leu Lys Phe Arg Ser
65 70 75 80

Met Lys Ile Asp Ala Pro Lys Asn Val Ala Pro Arg Asn Leu Tyr Asn
85 90 95

Pro Glu Gln Trp Ile Thr Lys Val Gly Ala Phe Leu Arg Lys Thr Ser
100 105 110

Leu Asp Glu Leu Pro Gln Leu Phe Asn Ile Leu Val Gly Asn Met Ser
115 120 125

Ile Val Gly Pro Arg Pro Ala Gly Ile Asn Glu Leu Asp Leu Ile Ala
130 135 140

Glu Arg Asp Lys Tyr Gly Ala Asn Asp Ile Leu Pro Gly Leu Thr Gly
145 150 155 160

Trp Ala Gln Ile Asn Gly Arg Asp Thr Leu Ser Val Glu Met Lys Thr
165 170 175

Glu Leu Asp Gly Tyr Tyr Val Lys His Leu Ser Leu Ile Met Asp Ile
180 185 190

Arg Cys Ile Val Lys Thr Ile Pro Tyr Val Leu Lys Arg Lys Gly Ile
195 200 205

Val Glu Gly Ser Gly Lys Lys Glu Ser
210 215

<210> 233

<211> 409

<212> PRT

<213> Streptococcus pneumoniae

<400> 233

Met Lys Ile Leu Phe Val Cys Gln His Tyr Lys Pro Glu Pro Phe Arg
1 5 10 15

Leu Ser Asp Ile Cys Glu Asp Leu Val Arg Lys Gly His Glu Val Ser
20 25 30

Val Leu Ala Gly Ile Pro Asn Tyr Pro Glu Gly Lys Ile Tyr Ala Asp
 35 40 45

Tyr Arg His Asn Lys Lys Arg Arg Glu Ile Ile Glu Gly Val Thr Ile
 50 55 60

Tyr Arg Ser Tyr Thr Ile Pro Arg Lys Lys Ser Val Val Phe Arg Leu
 65 70 75 80

Leu Asn Tyr Phe Ser Phe Ala Ile Ser Ser Thr Leu Gly Val Leu Leu
 85 90 95

Gly Arg Tyr Lys Thr Lys Asp Gly Ser Asn Phe Asp Cys Val Phe Val
 100 105 110

Asn Gln Leu Ser Pro Val Met Met Ala Trp Ala Gly Met Ala Tyr Lys
 115 120 125

Lys Lys Tyr Lys Lys Pro Met Phe Leu Tyr Cys Met Asp Val Trp Pro
 130 135 140

Asp Ser Leu Thr Val Gly Gly Val Lys Gln Asp Gly Leu Ile Phe Lys
 145 150 155 160

Leu Phe Lys Phe Ile Ser Lys Lys Val Tyr Arg Ala Ser Asp Tyr Ile
 165 170 175

Phe Val Thr Ser Pro Ser Phe Lys Asn Tyr Phe Val Lys Gln Phe Asp
 180 185 190

Ile Ser Glu Gln Lys Ile Thr Tyr Leu Pro Gln Tyr Ala Glu Asp Leu
 195 200 205

Phe Ile Pro Asp Glu Ser Ile Val Asn Lys Glu Ser Val Asp Leu Thr
 210 215 220

Phe Ala Gly Asn Ile Gly Lys Ala Gln Asn Leu Glu Thr Ile Leu Lys
 225 230 235 240

Ala Ala Ser Leu Ile Glu Lys Asn Thr Asn Leu Pro Lys Lys Ile His

245										250										255																											
Phe	His	Phe	Val	Gly	Asp	Gly	Thr	Glu	Leu	Leu	Ser	Met	Lys	Ala	Leu	Phe	His	Phe	Val	Gly	Asp	Gly	Thr	Glu	Leu	Leu	Ser	Met	Lys	Ala	Leu	Phe	His	Phe	Val	Gly	Asp	Gly	Thr	Glu	Leu	Leu	Ser	Met	Lys	Ala	Leu
										265										270																											
260																																															
Ala	His	Glu	Leu	Glu	Leu	Lys	Asn	Ile	Ser	Phe	Tyr	Gly	Arg	Arg	Ser	Ala	His	Glu	Leu	Glu	Leu	Lys	Asn	Ile	Ser	Phe	Tyr	Gly	Arg	Arg	Ser	Ala	His	Glu	Leu	Glu	Leu	Lys	Asn	Ile	Ser	Phe	Tyr	Gly	Arg	Arg	Ser
										280										285																											
275																																															
Leu	Glu	Glu	Met	Pro	Ser	Phe	Tyr	Lys	Lys	Ser	Asp	Ala	Met	Leu	Val	Leu	Glu	Glu	Met	Pro	Ser	Phe	Tyr	Lys	Lys	Ser	Asp	Ala	Met	Leu	Val	Leu	Glu	Glu	Met	Pro	Ser	Phe	Tyr	Lys	Lys	Ser	Asp	Ala	Met	Leu	Val
										295										300																											
290																																															
Ser	Leu	Ile	Gly	Asp	Ser	Ile	Val	Ser	Arg	Thr	Ile	Pro	Gly	Lys	Val	Ser	Leu	Ile	Gly	Asp	Ser	Ile	Val	Ser	Arg	Thr	Ile	Pro	Gly	Lys	Val	Ser	Leu	Ile	Gly	Asp	Ser	Ile	Val	Ser	Arg	Thr	Ile	Pro	Gly	Lys	Val
										310										315																											
305																																															
Gln	Ser	Tyr	Met	Ala	Ala	Gly	Lys	Pro	Ile	Ile	Gly	Ala	Ile	Ser	Gly	Gln	Ser	Tyr	Met	Ala	Ala	Gly	Lys	Pro	Ile	Ile	Gly	Ala	Ile	Ser	Gly	Gln	Ser	Tyr	Met	Ala	Ala	Gly	Lys	Pro	Ile	Ile	Gly	Ala	Ile	Ser	Gly
										325										330																											
320																																															
Asp	Ala	Lys	Ile	Ile	Val	Glu	Glu	Ala	Asn	Cys	Gly	Tyr	Val	Ser	Pro	Asp	Ala	Lys	Ile	Ile	Val	Glu	Glu	Ala	Asn	Cys	Gly	Tyr	Val	Ser	Pro	Asp	Ala	Lys	Ile	Ile	Val	Glu	Glu	Ala	Asn	Cys	Gly	Tyr	Val	Ser	Pro
										340										345																											
335																																															
Glu	Arg	Asp	Val	Lys	Gln	Leu	Ala	Lys	Asn	Ile	Cys	Lys	Phe	Ser	Met	Glu	Arg	Asp	Val	Lys	Gln	Leu	Ala	Lys	Asn	Ile	Cys	Lys	Phe	Ser	Met	Glu	Arg	Asp	Val	Lys	Gln	Leu	Ala	Lys	Asn	Ile	Cys	Lys	Phe	Ser	Met
										355										360																											
350																																															
Leu	Ser	Ile	Lys	Arg	Gln	Arg	Glu	Leu	Gly	Lys	Lys	Ala	Arg	Cys	Tyr	Leu	Ser	Ile	Lys	Arg	Gln	Arg	Glu	Leu	Gly	Lys	Lys	Ala	Arg	Cys	Tyr	Leu	Ser	Ile	Lys	Arg	Gln	Arg	Glu	Leu	Gly	Lys	Lys	Ala	Arg	Cys	Tyr
										370										375																											
365																																															
Tyr	Glu	Asn	His	Phe	Ser	Lys	Glu	Gln	Phe	Met	Leu	Glu	Leu	Glu	Thr	Tyr	Glu	Asn	His	Phe	Ser	Lys	Glu	Gln	Phe	Met	Leu	Glu	Leu	Glu	Thr	Tyr	Glu	Asn	His	Phe	Ser	Lys	Glu	Gln	Phe	Met	Leu	Glu	Leu	Glu	Thr
										385										390																											
380																																															
Cys	Leu	Glu	Arg	Glu	Ser	Lys	Lys	Glu								Cys	Leu	Glu	Arg	Glu	Ser	Lys	Lys	Glu								Cys	Leu	Glu	Arg	Glu	Ser	Lys	Lys	Glu							
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<210> 234
<211> 372
<212> PRT
<213> Streptococcus pneumoniae
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<400> 234

Met Ile Lys Val Leu His Leu Phe Thr Thr Leu Asp Ser Gly Gly Val
1 5 10 15

Glu Ser Phe Leu Phe Asn Tyr Tyr Ser His Ile Asp Arg Lys Lys Ile

20										25										30																			
Gln	Phe	Asp	Phe	Ile	Val	Pro	Gly	Lys	Glu	Gln	Gly	Phe	Leu	Glu	Asp	Gln	Phe	Leu	Glu	Asp	Gln	Phe	Leu	Glu	Asp	Gln	Phe	Leu	Glu	Asp									
35										40										45																			
Lys	Met	Lys	Glu	Leu	Gly	Ala	Lys	Val	Tyr	His	Val	Pro	Leu	Leu	Arg	Lys	Met	Lys	Glu	Leu	Gly	Ala	Lys	Val	Tyr	His	Val	Pro	Leu	Leu	Arg								
50										55										60																			
Lys	Lys	Pro	Leu	His	Gln	Phe	Leu	Ser	Leu	Ala	Arg	Ile	Ile	Lys	Lys	Lys	Lys	Pro	Leu	His	Gln	Phe	Leu	Ser	Leu	Ala	Arg	Ile	Ile	Lys	Lys								
65										70										75										80									
Gly	Asp	Tyr	Asp	Ile	Val	His	Cys	His	Gly	Tyr	Lys	Ser	Ala	Ile	Gly	Gly	Asp	Tyr	Asp	Ile	Val	His	Cys	His	Gly	Tyr	Lys	Ser	Ala	Ile	Gly								
85										90										95																			
Leu	Ile	Leu	Ser	Lys	Ile	Ile	Gly	Cys	Lys	Ile	Arg	Ile	Ile	His	Ser	Leu	Ile	Leu	Ser	Lys	Ile	Ile	Gly	Cys	Lys	Ile	Arg	Ile	Ile	His	Ser								
100										105										110																			
His	Met	Ala	Tyr	Val	Thr	Glu	Asn	Ser	Phe	Gln	Lys	Val	Leu	Arg	Lys	His	Met	Ala	Tyr	Val	Thr	Glu	Asn	Ser	Phe	Gln	Lys	Val	Leu	Arg	Lys								
115										120										125																			
Leu	Val	Thr	Ile	Leu	Val	Lys	Ile	Leu	Ala	Thr	His	Trp	Phe	Ala	Cys	Leu	Val	Thr	Ile	Leu	Val	Lys	Ile	Leu	Ala	Thr	His	Trp	Phe	Ala	Cys								
130										135										140																			
Gly	Glu	Asp	Ser	Ala	Lys	Trp	Leu	Tyr	Gly	Glu	Lys	Ala	Tyr	Lys	Asp	Gly	Glu	Asp	Ser	Ala	Lys	Trp	Leu	Tyr	Gly	Glu	Lys	Ala	Tyr	Lys	Asp								
145										150										155										160									
Gly	Lys	Ile	Glu	Ile	Ile	Phe	Asn	Ala	Ile	Asp	Leu	Lys	Lys	Tyr	Gln	Gly	Lys	Ile	Glu	Ile	Ile	Phe	Asn	Ala	Ile	Asp	Leu	Lys	Lys	Tyr	Gln								
165										170										175																			
Phe	Leu	Ser	Asp	Val	Arg	Glu	Lys	Cys	Arg	Arg	Glu	Leu	Asp	Val	Ser	Phe	Leu	Ser	Asp	Val	Arg	Glu	Lys	Cys	Arg	Arg	Glu	Leu	Asp	Val	Ser								
180										185										190																			
Asn	Lys	Phe	Val	Leu	Gly	Asn	Ile	Ala	Arg	Leu	Ser	Asp	Gln	Lys	Asn	Asn	Lys	Phe	Val	Leu	Gly	Asn	Ile	Ala	Arg	Leu	Ser	Asp	Gln	Lys	Asn								
195										200										205																			
Gln	Ser	Tyr	Leu	Phe	Asn	Val	Leu	Lys	Glu	Leu	Ile	Leu	Ile	Lys	Pro	Gln	Ser	Tyr	Leu	Phe	Asn	Val	Leu	Lys	Glu	Leu	Ile	Leu	Ile	Lys	Pro								
210										215										220																			
Asn	Val	Ile	Leu	Leu	Val	Gly	Asn	Gly	Glu	Asp	Glu	Gln	Lys	Leu	Asn	Val	Ile	Leu	Leu	Val	Gly	Asn	Gly	Glu	Asp	Glu	Gln	Lys	Leu										
225										230										235										240									

Lys Gln Lys Ala Leu Glu Leu Asn Leu Thr Pro Tyr Val Leu Phe Leu
 245 250 255

Gly Arg Arg Thr Asp Ile Ser Asp Leu Leu Ser Ala Met Asp Val Phe
 260 265 270

Leu Leu Pro Ser Lys Tyr Glu Gly Leu Pro Val Ser Leu Val Glu Ala
 275 280 285

Gln Ala Ser Gly Leu Gln Ile Leu Ser Ser Asp Thr Val Thr Gln Glu
 290 295 300

Val Asp Val Thr Lys Asn Ile Ser Tyr Leu Pro Ile Asn Glu Glu Ser
 305 310 315 320

Val Leu Leu Trp Lys Asp Lys Val Leu Ser Leu Thr Ser Glu Glu Cys
 325 330 335

Asn Arg Phe Glu Ile Asn Asn Ser Met Thr Asp Gly Leu Tyr Asp Ile
 340 345 350

Cys Tyr Gln Ala Ser Lys Leu Leu Asn Arg Tyr Gln Glu Met Cys Val
 355 360 365

Ile Lys Glu Ile
 370

<210> 235

<211> 413

<212> PRT

<213> Streptococcus pneumoniae

<400> 235

Met Lys Val Asp Arg Ile Ser Phe Ile Lys Asn Thr Ser Ser Leu Tyr
 1 5 10 15

Ile Leu Asn Ile Val Lys Leu Leu Phe Pro Leu Leu Thr Leu Pro Tyr
 20 25 30

Leu Thr Arg Val Leu Ser Leu Asp Ala Tyr Gly Met Val Ile Tyr Val
 35 40 45

Lys Ala Leu Ile Ala Tyr Val Gln Leu Val Ile Asp Phe Gly Phe Met
 50 55 60

Ile Ser Ala Thr Lys Asn Ile Val Asn Ala Cys Thr Thr Pro Ser Lys
 65 70 75 80

Ile Gly Arg Ile Val Gly Asp Thr Leu Val Glu Lys Ile Phe Leu Ser
 85 90 95

Ile Ile Ser Ile Leu Ile Tyr Thr Ile Leu Met Trp Gln Ile Pro Ile
 100 105 110

Met Arg Glu Asn Ile Leu Phe Ser Val Phe Tyr Leu Leu Ala Thr Val
 115 120 125

Thr Asn Ile Phe Ile Phe Asp Phe Leu Phe Arg Gly Ile Glu Lys Met
 130 135 140

His Ala Val Ala Ile Pro Tyr Ile Ile Ser Lys Thr Ile Ile Thr Ile
 145 150 155 160

Leu Thr Phe Ile Val Val Lys Asp Asp Ser Ser Ile Leu Trp Ile Pro
 165 170 175

Ile Leu Glu Gly Ile Gly Asn Leu Val Ala Ala Val Val Ser Tyr Arg
 180 185 190

Phe Leu His Tyr Tyr Gly Ile Lys Leu Ser Phe Ser Tyr Leu Ser Val
 195 200 205

Trp Val Lys Asp Leu Lys Glu Ser Ser Ile Tyr Phe Leu Ser Asn Phe
 210 215 220

Ala Thr Thr Ile Phe Gly Val Phe Thr Thr Val Ile Ser Gly Phe Tyr
 225 230 235 240

Leu Gln Ser Gln Glu Ile Ala Phe Trp Gly Ile Ala Met Gln Leu Leu
 245 250 255

Ser Ala Ala Lys Ser Leu Tyr Asn Pro Ile Ala Asn Ser Leu Tyr Pro
 260 265 270

His Met Ile Arg Thr Lys Asp Ile Gln Ser Val Lys Ser Ile Asn Arg
 275 280 285

Ile Met Phe Ile Pro Ile Ile Phe Gly Val Leu Ile Val Leu Phe Phe
 290 295 300

Ser Asn Gln Ile Leu Ser Ile Ile Gly Gly Glu Lys Tyr Thr Val Ser
 305 310 315 320

Ala Asp Phe Leu Lys Tyr Leu Leu Pro Ala Phe Val Ala Ser Phe Tyr
 325 330 335

Ser Met Ile Tyr Gly Trp Pro Val Leu Gly Ala Ile Asp Lys Val Lys
 340 345 350

Glu Thr Thr Met Thr Thr Ile Leu Ala Ser Ile Val Gln Thr Leu Gly
 355 360 365

Leu Gly Ile Phe Ile Leu Ser Asp Asn Phe Ser Leu Val Thr Leu Ala
 370 375 380

Ile Cys Ser Ser Met Ser Glu Val Val Leu Trp Ile Ser Arg Tyr Leu
 385 390 395 400

Ile Tyr Phe Lys Asn Arg Ser Leu Phe Val Arg Ser Lys
 405 410

<210> 236

<211> 1767

<212> PRT

<213> Streptococcus pneumoniae

<400> 236

Met Asn Lys Gly Leu Phe Glu Lys Arg Cys Lys Tyr Ser Ile Arg Lys
 1 5 10 15

Phe Ser Leu Gly Val Ala Ser Val Met Ile Gly Ala Ala Phe Phe Gly
 20 25 30

Thr Ser Pro Val Leu Ala Asp Ser Val Gln Ser Gly Ser Thr Ala Asn
 35 40 45

Leu Pro Ala Asp Leu Ala Thr Ala Leu Ala Thr Ala Lys Glu Asn Asp
 50 55 60

Gly Arg Asp Phe Glu Ala Pro Lys Val Gly Glu Asp Gln Gly Ser Pro
 65 70 75 80

Glu Val Thr Asp Gly Pro Lys Thr Glu Glu Glu Leu Leu Ala Leu Glu
 85 90 95

Lys Glu Lys Pro Ala Glu Glu Lys Pro Lys Glu Asp Lys Pro Ala Ala
 100 105 110

Ala Lys Pro Glu Thr Pro Lys Thr Val Thr Pro Glu Trp Gln Thr Val
 115 120 125

Ala Asn Lys Glu Gln Gln Gly Thr Val Thr Ile Arg Glu Glu Lys Gly
 130 135 140

Val Arg Tyr Asn Gln Leu Ser Ser Thr Ala Gln Asn Asp Asn Ala Gly
 145 150 155 160

Lys Pro Ala Leu Phe Glu Lys Lys Gly Leu Thr Val Asp Ala Asn Gly
 165 170 175

Asn Ala Thr Val Asp Leu Thr Phe Lys Asp Asp Ser Glu Lys Gly Lys
 180 185 190

Ser Arg Phe Gly Val Phe Leu Lys Phe Lys Asp Thr Lys Asn Asn Val
 195 200 205

Phe Val Gly Tyr Asp Lys Asp Gly Trp Phe Trp Glu Tyr Lys Ser Pro
 210 215 220

Thr Thr Ser Thr Trp Tyr Arg Gly Ser Arg Val Ala Ala Pro Glu Thr
 225 230 235 240

Gly Ser Thr Asn Arg Leu Ser Ile Thr Leu Lys Ser Asp Gly Gln Leu
 245 250 255

Asn Ala Ser Asn Asn Asp Val Asn Leu Phe Asp Thr Val Thr Leu Pro
 260 265 270

Ala Ala Val Asn Asp His Leu Lys Asn Glu Lys Lys Ile Leu Leu Lys
 275 280 285

Ala Gly Ser Tyr Asp Asp Glu Arg Thr Val Val Ser Val Lys Thr Asp
 290 295 300

Asn Gln Glu Gly Val Lys Thr Glu Asp Thr Pro Ala Glu Lys Glu Thr
 305 310 315 320

Gly Pro Glu Val Asp Asp Ser Lys Val Thr Tyr Asp Thr Ile Gln Ser
 325 330 335

Lys Val Leu Lys Ala Val Ile Asp Gln Ala Phe Pro Arg Val Lys Glu
 340 345 350

Tyr Ser Leu Asn Gly His Thr Leu Pro Gly Gln Val Gln Gln Phe Asn
 355 360 365

Gln Val Phe Ile Asn Asn His Arg Ile Thr Pro Glu Val Thr Tyr Lys
 370 375 380

Lys Ile Asn Glu Thr Thr Ala Glu Tyr Leu Met Lys Leu Arg Asp Asp
 385 390 395 400

Ala His Leu Ile Asn Ala Glu Met Thr Val Arg Leu Gln Val Val Asp
 405 410 415

Asn Gln Leu His Phe Asp Val Thr Lys Ile Val Asn His Asn Gln Val
 420 425 430

Thr Pro Gly Gln Lys Ile Asp Asp Glu Ser Lys Leu Leu Ser Ser Ile
 435 440 445

Ser Phe Leu Gly Asn Ala Leu Val Ser Val Ser Ser Asn Gln Thr Gly
 450 455 460

Ala Lys Phe Asp Gly Ala Thr Met Ser Asn Asn Thr His Val Ser Gly
 465 470 475 480

Asp Asp His Ile Asp Val Thr Asn Pro Met Lys Asp Leu Ala Lys Gly

485										490					495				
Tyr	Met	Tyr	Gly	Phe	Val	Ser	Thr	Asp	Lys	Leu	Ala	Ala	Gly	Val	Trp				
			500					505					510						
Ser	Asn	Ser	Gln	Asn	Ser	Tyr	Gly	Gly	Gly	Ser	Asn	Asp	Trp	Thr	Arg				
			515				520						525						
Leu	Thr	Ala	Tyr	Lys	Glu	Thr	Val	Gly	Asn	Ala	Asn	Tyr	Val	Gly	Ile				
	530					535					540								
His	Ser	Ser	Glu	Trp	Gln	Trp	Glu	Lys	Ala	Tyr	Lys	Gly	Ile	Val	Phe				
	545				550					555					560				
Pro	Glu	Tyr	Thr	Lys	Glu	Leu	Pro	Ser	Ala	Lys	Val	Val	Ile	Thr	Glu				
				565					570					575					
Asp	Ala	Asn	Ala	Asp	Lys	Asn	Val	Asp	Trp	Gln	Asp	Gly	Ala	Ile	Ala				
			580					585					590						
Tyr	Arg	Ser	Ile	Met	Asn	Asn	Pro	Gln	Gly	Trp	Glu	Lys	Val	Lys	Asp				
		595					600					605							
Ile	Thr	Ala	Tyr	Arg	Ile	Ala	Met	Asn	Phe	Gly	Ser	Gln	Ala	Gln	Asn				
	610					615					620								
Pro	Phe	Leu	Met	Thr	Leu	Asp	Gly	Ile	Lys	Lys	Ile	Asn	Leu	His	Thr				
	625				630					635				640					
Asp	Gly	Leu	Gly	Gln	Gly	Val	Leu	Leu	Lys	Gly	Tyr	Gly	Ser	Glu	Gly				
				645					650					655					
His	Asp	Ser	Gly	His	Leu	Asn	Tyr	Ala	Asp	Ile	Gly	Lys	Arg	Ile	Gly				
			660					665					670						
Gly	Val	Glu	Asp	Phe	Lys	Thr	Leu	Ile	Glu	Lys	Ala	Lys	Lys	Tyr	Gly				
		675					680					685							
Ala	His	Leu	Gly	Ile	His	Val	Asn	Ala	Ser	Glu	Thr	Tyr	Pro	Glu	Ser				
	690					695					700								

Lys Tyr Phe Asn Glu Lys Ile Leu Arg Lys Asn Pro Asp Gly Ser Tyr
 705 710 715 720
 Ser Tyr Gly Trp Asn Trp Leu Asp Gln Gly Ile Asn Ile Asp Ala Ala
 725 730 735
 Tyr Asp Leu Ala His Gly Arg Leu Ala Arg Trp Glu Asp Leu Lys Lys
 740 745 750
 Lys Leu Gly Asp Gly Leu Asp Phe Ile Tyr Val Asp Val Trp Gly Asn
 755 760 765
 Gly Gln Ser Gly Asp Asn Gly Ala Trp Ala Thr His Val Leu Ala Lys
 770 775 780
 Glu Ile Asn Lys Gln Gly Trp Arg Phe Ala Ile Glu Trp Gly His Gly
 785 790 795 800
 Gly Glu Tyr Asp Ser Thr Phe His His Trp Ala Ala Asp Leu Thr Tyr
 805 810 815
 Gly Gly Tyr Thr Asn Lys Gly Ile Asn Ser Ala Ile Thr Arg Phe Ile
 820 825 830
 Arg Asn His Gln Lys Asp Ala Trp Val Gly Asp Tyr Arg Ser Tyr Gly
 835 840 845
 Gly Ala Ala Asn Tyr Pro Leu Leu Gly Gly Tyr Ser Met Lys Asp Phe
 850 855 860
 Glu Gly Trp Gln Gly Arg Ser Asp Tyr Asn Gly Tyr Val Thr Asn Leu
 865 870 875 880
 Phe Ala His Asp Val Met Thr Lys Tyr Phe Gln His Phe Thr Val Ser
 885 890 895
 Lys Trp Glu Asn Gly Thr Pro Val Thr Met Thr Asp Asn Gly Ser Thr
 900 905 910
 Tyr Lys Trp Thr Pro Glu Met Arg Val Glu Leu Val Asp Ala Asp Asn
 915 920 925

Asn Lys Val Val Val Thr Arg Lys Ser Asn Asp Val Asn Ser Pro Gln
 930 935 940

Tyr Arg Glu Arg Thr Val Thr Leu Asn Gly Arg Val Ile Gln Asp Gly
 945 950 955 960

Ser Ala Tyr Leu Thr Pro Trp Asn Trp Asp Ala Asn Gly Lys Lys Leu
 965 970 975

Ser Thr Asp Lys Glu Lys Met Tyr Tyr Phe Asn Thr Gln Ala Gly Ala
 980 985 990

Thr Thr Trp Thr Leu Pro Ser Asp Trp Ala Lys Ser Lys Val Tyr Leu
 995 1000 1005

Tyr Lys Leu Thr Asp Gln Gly Lys Thr Glu Glu Gln Glu Leu Thr
 1010 1015 1020

Val Lys Asp Gly Lys Ile Thr Leu Asp Leu Leu Ala Asn Gln Pro
 1025 1030 1035

Tyr Val Leu Tyr Arg Ser Lys Gln Thr Asn Pro Glu Met Ser Trp
 1040 1045 1050

Ser Glu Gly Met His Ile Tyr Asp Gln Gly Phe Asn Ser Gly Thr
 1055 1060 1065

Leu Lys His Trp Thr Ile Ser Gly Asp Ala Ser Lys Ala Glu Ile
 1070 1075 1080

Val Lys Ser Gln Gly Ala Asn Asp Met Leu Arg Ile Gln Gly Asn
 1085 1090 1095

Lys Glu Lys Val Ser Leu Thr Gln Lys Leu Thr Gly Leu Lys Pro
 1100 1105 1110

Asn Thr Lys Tyr Ala Val Tyr Val Gly Val Asp Asn Arg Ser Asn
 1115 1120 1125

Ala Lys Ala Ser Ile Thr Val Asn Thr Gly Glu Lys Glu Val Thr
 1130 1135 1140

Thr Tyr	Thr Asn Lys Ser	Leu	Ala Leu Asn Tyr	Val	Lys Ala Tyr
1145		1150		1155	
Ala His	Asn Thr Arg Arg	Asp	Asn Ala Thr Val	Asp	Asp Thr Ser
1160		1165		1170	
Tyr Phe	Gln Asn Met Tyr	Ala	Phe Phe Thr Thr	Gly	Ala Asp Val
1175		1180		1185	
Ser Asn	Val Thr Leu Thr	Leu	Ser Arg Glu Ala	Gly	Asp Gln Ala
1190		1195		1200	
Thr Tyr	Phe Asp Glu Ile	Arg	Thr Phe Glu Asn	Asn	Ser Ser Met
1205		1210		1215	
Tyr Gly	Asp Lys His Asp	Thr	Gly Lys Gly Thr	Phe	Lys Gln Asp
1220		1225		1230	
Phe Glu	Asn Val Ala Gln	Gly	Ile Phe Pro Phe	Val	Val Gly Gly
1235		1240		1245	
Val Glu	Gly Val Glu Asp	Asn	Arg Thr His Leu	Ser	Glu Lys His
1250		1255		1260	
Asn Pro	Tyr Thr Gln Arg	Gly	Trp Asn Gly Lys	Lys	Val Asp Asp
1265		1270		1275	
Val Ile	Glu Gly Asn Trp	Ser	Leu Lys Thr Asn	Gly	Leu Val Ser
1280		1285		1290	
Arg Arg	Asn Leu Val Tyr	Gln	Thr Ile Pro Gln	Asn	Phe Arg Phe
1295		1300		1305	
Glu Ala	Gly Lys Thr Tyr	Arg	Val Thr Phe Glu	Tyr	Glu Ala Gly
1310		1315		1320	
Ser Asp	Asn Thr Tyr Ala	Phe	Val Val Gly Lys	Gly	Glu Phe Gln
1325		1330		1335	
Ser Gly	Arg Arg Gly Thr	Gln	Ala Ser Asn Leu	Glu	Met His Glu

1340	1345	1350
Leu Pro Asn Thr Trp Thr Asp	Ser Lys Lys Ala Lys	Lys Ala Thr
1355	1360	1365
Phe Leu Val Thr Gly Ala Glu	Thr Gly Asp Thr Trp	Val Gly Ile
1370	1375	1380
Tyr Ser Thr Gly Asn Ala Ser	Asn Thr Arg Gly Asp	Ser Gly Gly
1385	1390	1395
Asn Ala Asn Phe Arg Gly Tyr	Asn Asp Phe Met Met	Asp Asn Leu
1400	1405	1410
Gln Ile Glu Glu Ile Thr Leu	Thr Gly Lys Met Leu	Thr Glu Asn
1415	1420	1425
Ala Leu Lys Asn Tyr Leu Pro	Thr Val Ala Met Thr	Asn Tyr Thr
1430	1435	1440
Lys Glu Ser Met Asp Ala Leu	Lys Glu Ala Val Phe	Asn Leu Ser
1445	1450	1455
Gln Ala Asp Asp Asp Ile Ser	Val Glu Glu Ala Arg	Ala Glu Ile
1460	1465	1470
Ala Lys Ile Glu Ala Leu Lys	Asn Ala Leu Val Gln	Lys Lys Thr
1475	1480	1485
Ala Leu Val Ala Asp Asp Phe	Ala Ser Leu Thr Ala	Pro Ala Gln
1490	1495	1500
Ala Gln Glu Gly Leu Ala Asn	Ala Phe Asp Gly Asn	Val Ser Ser
1505	1510	1515
Leu Trp His Thr Ser Trp Asn	Gly Gly Asp Val Gly	Lys Pro Ala
1520	1525	1530
Thr Met Val Leu Lys Glu Pro	Thr Glu Ile Thr Gly	Leu Arg Tyr
1535	1540	1545

Val Pro	Arg Gly Ser Gly Ser	Asn Gly Asn Leu Arg	Asp Val Lys
1550	1555	1560	
Leu Val	Val Thr Asp Glu Ser	Gly Lys Glu His Thr	Phe Thr Ala
1565	1570	1575	
Thr Asp	Trp Pro Asn Asn Asn	Lys Pro Lys Asp Ile	Asp Phe Gly
1580	1585	1590	
Lys Thr	Ile Lys Ala Lys Lys	Ile Val Leu Thr Gly	Thr Lys Thr
1595	1600	1605	
Tyr Gly	Asp Gly Gly Asp Lys	Tyr Gln Ser Ala Ala	Glu Leu Ile
1610	1615	1620	
Phe Thr	Arg Pro Gln Val Ala	Glu Thr Pro Leu Asp	Leu Ser Gly
1625	1630	1635	
Tyr Glu	Ala Ala Leu Val Lys	Ala Gln Lys Leu Thr	Asp Lys Asp
1640	1645	1650	
Asn Gln	Glu Glu Val Ala Ser	Val Gln Ala Ser Met	Lys Tyr Ala
1655	1660	1665	
Thr Asp	Asn His Leu Leu Thr	Glu Arg Met Val Glu	Tyr Phe Ala
1670	1675	1680	
Asp Tyr	Leu Asn Gln Leu Lys	Asp Ser Ala Thr Lys	Pro Asp Ala
1685	1690	1695	
Pro Thr	Val Glu Lys Pro Glu	Phe Lys Leu Arg Ser	Leu Ala Ser
1700	1705	1710	
Glu Gln	Gly Lys Thr Pro Asp	Tyr Lys Gln Glu Ile	Ala Arg Pro
1715	1720	1725	
Glu Thr	Pro Glu Gln Ile Leu	Pro Ala Thr Gly Glu	Ser Gln Ser
1730	1735	1740	
Asp Thr	Ala Leu Ile Leu Ala	Ser Val Ser Leu Ala	Leu Ser Ala
1745	1750	1755	

Leu Phe Val Val Lys Thr Lys Lys Asp
 1760 1765

<210> 237
 <211> 232
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 237

Met Arg Lys Phe Lys Ile Phe Leu Phe Ile Glu Ala Cys Leu Leu Thr
 1 5 10 15

Gly Ala Leu Ile Leu Met Val Ser Glu His Phe Ser Arg Phe Leu Leu
 20 25 30

Ile Leu Phe Leu Phe Leu Leu Leu Ile Arg Tyr Tyr Thr Gly Lys Glu
 35 40 45

Gly Asn Asn Leu Leu Leu Val Ala Ala Thr Ile Leu Phe Phe Phe Ile
 50 55 60

Val Met Leu Asn Pro Phe Val Ile Leu Ala Ile Phe Val Ala Val Ile
 65 70 75 80

Tyr Ser Leu Phe Leu Leu Tyr Pro Met Met Asn Gln Glu Lys Glu Gln
 85 90 95

Thr Asn Leu Val Phe Glu Glu Val Val Thr Val Lys Lys Glu Lys Asn
 100 105 110

Arg Trp Phe Gly Asn Leu His His Phe Ser Ser Tyr Gln Thr Cys Gln
 115 120 125

Phe Asp Asp Ile Asn Leu Phe Arg Phe Met Gly Lys Asp Thr Ile His
 130 135 140

Leu Glu Arg Val Ile Leu Thr Asn His Asp Asn Val Ile Ile Leu Arg
 145 150 155 160

Lys Met Val Gly Thr Thr Lys Ile Ile Val Pro Val Asp Val Glu Val
 165 170 175

Ser Leu Ser Val Asn Cys Leu Tyr Gly Asp Leu Ile Phe Phe Asn Gln
180 185 190

Pro Lys Arg Ala Leu Arg Asn Glu His Tyr His Gln Glu Thr Lys Asp
195 200 205

Tyr Leu Lys Ser Asn Lys Ser Val Lys Ile Phe Leu Thr Thr Met Ile
210 215 220

Gly Asp Val Glu Val Val Arg Gly
225 230

<210> 238
<211> 79
<212> PRT
<213> Streptococcus pneumoniae

<400> 238

Met Lys Lys Thr Val Tyr Lys Lys Leu Gly Ile Ser Ile Ile Ala Ser
1 5 10 15

Thr Leu Leu Ala Ser Gln Leu Ser Thr Val Ser Ala Leu Ser Val Ile
20 25 30

Ser Ser Thr Gly Glu Glu Tyr Glu Val Ser Glu Thr Leu Glu Lys Gly
35 40 45

Pro Glu Ser Asn Asp Ser Ser Leu Ser Glu Ile Ser Pro Thr Tyr Gly
50 55 60

Ser Tyr Tyr Gln Lys Gln Ser Glu Val Leu Ser Val Met Met Ile
65 70 75

<210> 239
<211> 778
<212> PRT
<213> Streptococcus pneumoniae

<400> 239

Met Asn Lys Lys Ile Leu Glu Thr Leu Glu Phe Asp Lys Val Lys Ala
1 5 10 15

Leu Phe Glu Pro His Leu Leu Thr Glu Gln Gly Leu Glu Gln Leu Arg
 20 25 30
 Gln Leu Ala Pro Thr Ala Lys Ala Asp Lys Ile Lys Gln Ala Phe Ala
 35 40 45
 Glu Met Lys Glu Met Gln Ala Leu Phe Val Glu Gln Pro His Phe Thr
 50 55 60
 Ile Leu Ser Thr Lys Glu Ile Ala Gly Val Cys Lys Arg Leu Glu Met
 65 70 75 80
 Gly Ala Asp Leu Asn Ile Glu Glu Phe Leu Leu Leu Lys Arg Val Leu
 85 90 95
 Leu Ala Ser Arg Glu Leu Gln Asn Phe Tyr Thr Asn Leu Glu Asn Val
 100 105 110
 Ser Leu Glu Glu Leu Ala Leu Trp Phe Glu Lys Leu His Asp Phe Pro
 115 120 125
 Gln Leu Gln Gly Asn Leu Gln Ala Phe Asn Asp Ala Gly Phe Ile Glu
 130 135 140
 Asn Phe Ala Ser Glu Glu Leu Ala Arg Ile Arg Arg Lys Ile His Asp
 145 150 155 160
 Ser Glu Ser Gln Val Arg Asp Val Leu Gln Asp Leu Leu Lys Gln Lys
 165 170 175
 Ala Gln Leu Leu Thr Glu Gly Ile Val Ala Ser Arg Asn Gly Arg Gln
 180 185 190
 Val Leu Pro Val Lys Asn Thr Tyr Arg Asn Lys Ile Ala Gly Val Val
 195 200 205
 His Asp Ile Ser Ala Ser Gly Asn Thr Val Tyr Ile Glu Pro Arg Glu
 210 215 220
 Val Val Lys Leu Ser Glu Glu Ile Ala Ser Leu Arg Ala Asp Glu Arg
 225 230 235 240

Tyr Glu Met Leu Arg Ile Leu Gln Glu Ile Ser Glu Arg Val Arg Pro
 245 250 255
 His Ala Ala Glu Ile Ala Asn Asp Ala Trp Ile Ile Gly His Leu Asp
 260 265 270
 Leu Ile Arg Ala Lys Val Arg Phe Ile Gln Glu Arg Gln Ala Val Val
 275 280 285
 Pro Gln Leu Ser Glu Asn Gln Glu Ile Gln Leu Leu His Val Cys His
 290 295 300
 Pro Leu Val Lys Asn Ala Val Ala Asn Asp Val Tyr Phe Gly Gln Asp
 305 310 315 320
 Leu Thr Ala Ile Val Ile Thr Gly Pro Asn Thr Gly Gly Lys Thr Ile
 325 330 335
 Met Leu Lys Thr Leu Gly Leu Thr Gln Val Met Ala Gln Ser Gly Leu
 340 345 350
 Pro Ile Leu Ala Asp Lys Gly Ser Arg Val Gly Ile Phe Glu Glu Ile
 355 360 365
 Phe Ala Asp Ile Gly Asp Glu Gln Ser Ile Glu Gln Ser Leu Ser Thr
 370 375 380
 Phe Ser Ser His Met Thr Asn Ile Val Asp Ile Leu Gly Lys Val Asn
 385 390 395 400
 Gln His Ser Leu Leu Leu Leu Asp Glu Leu Gly Ala Gly Thr Asp Pro
 405 410 415
 Gln Glu Gly Ala Ala Leu Ala Met Ala Ile Leu Glu Asp Leu Arg Leu
 420 425 430
 Arg Gln Ile Lys Thr Met Ala Thr Thr His Tyr Pro Glu Leu Lys Ala
 435 440 445
 Tyr Gly Ile Glu Thr Ala Phe Val Gln Asn Ala Ser Met Glu Phe Asp
 450 455 460

Thr Ala Thr Leu Arg Pro Thr Tyr Arg Phe Met Gln Gly Val Pro Gly
 465 470 475 480
 Arg Ser Asn Ala Phe Glu Ile Ala Lys Arg Leu Gly Leu Ser Glu Val
 485 490 495
 Ile Val Gly Asp Ala Ser Gln Gln Ile Asp Gln Asp Asn Asp Val Asn
 500 505 510
 Arg Ile Ile Glu Gln Leu Glu Glu Gln Thr Leu Glu Ser Arg Lys Arg
 515 520 525
 Leu Asp Asn Ile Arg Glu Val Glu Gln Glu Asn Leu Lys Met Asn Arg
 530 535 540
 Ala Leu Lys Lys Leu Tyr Asn Glu Leu Asn Arg Glu Lys Glu Thr Glu
 545 550 555 560
 Leu Asn Lys Ala Arg Glu Gln Ala Ala Glu Ile Val Asp Met Ala Leu
 565 570 575
 Ser Glu Ser Asp Gln Ile Leu Lys Asn Leu His Ser Lys Ser Gln Leu
 580 585 590
 Lys Pro His Glu Ile Ile Glu Ala Lys Ala Lys Leu Lys Lys Leu Ala
 595 600 605
 Pro Glu Lys Val Asp Leu Ser Lys Asn Lys Val Leu Gln Lys Ala Lys
 610 615 620
 Lys Lys Arg Ala Pro Lys Val Gly Asp Asp Ile Val Val Leu Ser Tyr
 625 630 635 640
 Gly Gln Arg Gly Thr Leu Thr Ser Gln Leu Lys Asp Gly Arg Trp Glu
 645 650 655
 Ala Gln Val Gly Leu Ile Lys Met Thr Leu Glu Glu Lys Glu Phe Asp
 660 665 670
 Leu Val Gln Ala Gln Gln Glu Lys Pro Val Lys Lys Lys Gln Val Asn

675	680	685
Val Val Lys Arg Thr Ser Gly Arg Gly Pro Gln Ala Arg Leu Asp Leu		
690	695	700
Arg Gly Lys Arg Tyr Glu Glu Ala Met Asn Glu Leu Asp Thr Phe Ile		
705	710	715 720
Asp Gln Ala Leu Leu Asn Asn Met Ala Gln Val Asp Ile Ile His Gly		
	725	730 735
Ile Gly Thr Gly Val Ile Arg Glu Gly Val Thr Lys Tyr Leu Gln Arg		
	740	745 750
Asn Lys His Val Lys Ser Phe Gly Tyr Ala Pro Gln Asn Ala Gly Gly		
	755	760 765
Ser Gly Ala Thr Ile Val Thr Phe Lys Gly		
	770	775
 <210> 240		
<211> 91		
<212> PRT		
<213> Streptococcus pneumoniae		
 <400> 240		
Met Ser Phe Leu Asp Lys Ser Asn Leu Gly Thr Asn Gln Val Gln Met		
1	5	10 15
Thr Asp Asn Pro Ser Val Ile Ser Asn Leu Ser Arg Met Arg Ala Asp		
	20	25 30
Thr Leu Arg Asn Phe Leu Glu Asn Ala Lys His Phe Ile Ala Leu Ile		
	35	40 45
Cys Ser Gln Thr Ser Asn Phe Phe Ala Gln Phe Asp Tyr Leu Thr Gly		
	50	55 60
Phe Asp Ile Asp Gly Val Ser Thr Ser Arg Asn Ile Met Asn Asp Thr		
	65	70 75 80
 Cys Asn Leu Ile Ala Val Gly Val Phe Asp Trp		

85

90

<210> 241
 <211> 303
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 241

Met Glu Val Arg Met Lys Lys Leu Pro Leu Val Phe Ser Gly Cys Leu
 1 5 10 15

Leu Gly Leu Ala Gly Ala Gly Asn Leu Ile Leu Asp Thr Leu Pro Val
 20 25 30

Leu Ser His Leu Phe Ser Leu Ile Gly Leu Val Leu Trp Ile Tyr Phe
 35 40 45

Leu Ile Leu His Leu Phe Asn Trp Lys Glu Thr Lys Gln Glu Leu Thr
 50 55 60

Lys Pro Pro Leu Leu Ser Gly Met Ala Thr Phe Pro Met Ala Gly Met
 65 70 75 80

Ile Leu Ser Thr Tyr Val Phe Arg Val Phe Ser Tyr Leu Pro Leu Val
 85 90 95

Ala Gln Gly Ile Trp Trp Phe Ser Phe Leu Leu Asp Leu Thr Leu Ile
 100 105 110

Ala Gly Phe Thr Ile Lys Phe Ala Cys Pro Gly Arg Arg Val His Ala
 115 120 125

Thr Pro Ser Trp Thr Val Leu Tyr Val Gly Ile Ala Val Ala Ala Leu
 130 135 140

Thr Tyr Pro Leu Val Gly Ile Ile Glu Ile Ala Tyr Ala Thr Leu Ser
 145 150 155 160

Phe Gly Phe Leu Leu Thr Phe Tyr Leu Tyr Pro Leu Ile Tyr Ser Asp
 165 170 175

Leu Lys Lys His Pro Leu Pro Leu Ala Leu Leu Gly Gln Glu Gly Ile

180	185	190
Tyr Cys Ala Pro Phe Ser Leu Leu Leu Ala Ser Leu Val Arg Val Gly		
195	200	205
Gly Thr Ser Leu Pro Thr Trp Val Leu Ile Val Met Ile Leu Ala Ser		
210	215	220
Gln Ser Phe Phe Phe Phe Val Leu Thr Arg Leu Pro Asn Ile Leu Lys		
225	230	235
Gln Gly Phe Gln Pro Ala Phe Ser Ala Leu Thr Phe Pro Thr Ile Ile		
245	250	255
Thr Ala Thr Ser Leu Lys Met Ala Gln Gly Ile Leu Lys Leu Pro Phe		
260	265	270
Leu Asp Tyr Leu Val Leu Ala Glu Thr Ile Ile Cys Leu Thr Ile Leu		
275	280	285
Phe Phe Val Leu Gly Ala Tyr Leu Ile Trp Leu Arg Lys Lys Val		
290	295	300
<210> 242		
<211> 281		
<212> PRT		
<213> Streptococcus pneumoniae		
<400> 242		
Met Tyr Leu Ile Glu Ile Leu Lys Ser Ile Phe Phe Gly Ile Val Glu		
1	5	10
Gly Ile Thr Glu Trp Leu Pro Ile Ser Ser Thr Gly His Leu Ile Leu		
20	25	30
Ala Glu Glu Phe Ile Gln Tyr Gln Asn Gln Asn Glu Ala Phe Met Ser		
35	40	45
Met Phe Asn Val Val Ile Gln Leu Gly Ala Ile Leu Ala Val Met Val		
50	55	60
Ile Tyr Phe Asn Lys Leu Asn Pro Phe Lys Pro Thr Lys Asp Lys Gln		

65		70		75		80
Glu Val Arg Lys Thr Trp Arg Leu Trp Leu Lys Val Leu Ile Ala Thr	85			90		95
Leu Pro Leu Leu Gly Val Phe Lys Phe Asp Asp Trp Phe Asp Thr His	100		105			110
Phe His Asn Met Val Ser Val Ala Leu Met Leu Ile Ile Tyr Gly Val	115		120			125
Ala Phe Ile Tyr Leu Glu Lys Arg Asn Lys Ala Arg Ala Ile Glu Pro	130		135			140
Ser Val Thr Glu Leu Asp Lys Leu Pro Tyr Thr Thr Ala Phe Tyr Ile	145		150		155	160
Gly Leu Phe Gln Val Leu Ala Leu Leu Pro Gly Thr Ser Arg Ser Gly	165			170		175
Ala Thr Ile Val Gly Gly Leu Leu Asn Gly Thr Ser Arg Ser Val Val	180		185			190
Thr Glu Phe Thr Phe Tyr Leu Gly Ile Pro Val Met Phe Gly Ala Ser	195		200		205	
Ala Leu Lys Ile Phe Lys Phe Val Lys Ala Gly Glu Leu Leu Ser Phe	210		215		220	
Gly Gln Leu Phe Leu Leu Leu Val Ala Met Gly Val Ala Phe Ala Val	225		230		235	240
Ser Met Val Ala Ile Arg Phe Leu Thr Ser Tyr Val Lys Lys His Asp	245			250		255
Phe Thr Leu Phe Gly Lys Tyr Arg Ile Val Leu Gly Ser Val Leu Leu	260		265			270
Leu Tyr Ser Phe Val Arg Leu Phe Val	275		280			

<210> 243
 <211> 304
 <212> PRT
 <213> Streptococcus pneumoniae

 <400> 243

 Met Leu Ile Lys Met Val Lys Thr Lys Lys Gln Lys Arg Asn Asn Leu
 1 5 10 15

 Leu Leu Gly Val Val Phe Phe Ile Gly Met Ala Val Met Ala Tyr Pro
 20 25 30

 Leu Val Ser Arg Leu Tyr Tyr Arg Val Glu Ser Asn Gln Gln Ile Ala
 35 40 45

 Asp Phe Asp Lys Glu Lys Ala Thr Leu Asp Glu Ala Asp Ile Asp Glu
 50 55 60

 Arg Met Lys Leu Ala Gln Ala Phe Asn Asp Ser Leu Asn Asn Val Val
 65 70 75 80

 Ser Gly Asp Pro Trp Ser Glu Glu Met Lys Lys Lys Gly Arg Ala Glu
 85 90 95

 Tyr Ala Arg Met Leu Glu Ile His Glu Arg Met Gly His Val Glu Ile
 100 105 110

 Pro Val Ile Asp Val Asp Leu Pro Val Tyr Ala Gly Thr Ala Glu Glu
 115 120 125

 Val Leu Gln Gln Gly Ala Gly His Leu Glu Gly Thr Ser Leu Pro Ile
 130 135 140

 Gly Gly Asn Ser Thr His Ala Val Ile Thr Ala His Thr Gly Leu Pro
 145 150 155 160

 Thr Ala Lys Met Phe Thr Asp Leu Thr Lys Leu Lys Val Gly Asp Lys
 165 170 175

 Phe Tyr Val His Asn Ile Lys Glu Val Met Ala Tyr Gln Val Asp Gln
 180 185 190

Val Lys Val Ile Glu Pro Thr Asn Phe Asp Asp Leu Leu Ile Val Pro
 195 200 205

Gly His Asp Tyr Val Thr Leu Leu Thr Cys Thr Pro Tyr Met Ile Asn
 210 215 220

Thr His Arg Leu Leu Val Arg Gly His Arg Ile Pro Tyr Val Ala Glu
 225 230 235 240

Val Glu Glu Glu Phe Ile Ala Ala Asn Lys Leu Ser His Leu Tyr Arg
 245 250 255

Tyr Leu Phe Tyr Val Ala Val Gly Leu Ile Val Ile Leu Leu Trp Ile
 260 265 270

Ile Arg Arg Leu Arg Lys Lys Lys Lys Gln Pro Glu Lys Ala Leu Lys
 275 280 285

Ala Leu Lys Ala Ala Arg Lys Glu Val Lys Val Glu Asp Gly Gln Gln
 290 295 300

<210> 244

<211> 297

<212> PRT

<213> Streptococcus pneumoniae

<400> 244

Met Asp Asn Ser Arg Arg Ser Arg Lys Lys Gly Thr Lys Lys Lys Lys
 1 5 10 15

His Pro Leu Ile Leu Leu Leu Ile Phe Leu Val Gly Phe Ala Val Ala
 20 25 30

Ile Tyr Pro Leu Val Ser Arg Tyr Tyr Tyr Arg Ile Glu Ser Asn Glu
 35 40 45

Val Ile Lys Glu Phe Asp Glu Thr Val Ser Gln Met Asp Lys Ala Glu
 50 55 60

Leu Glu Glu Arg Trp Arg Leu Ala Gln Ala Phe Asn Ala Thr Leu Lys
 65 70 75 80

Pro Ser Glu Ile Leu Asp Pro Phe Thr Glu Gln Glu Lys Lys Lys Gly
 85 90 95

Val Ser Glu Tyr Ala Asn Met Leu Lys Val His Glu Arg Ile Gly Tyr
 100 105 110

Val Glu Ile Pro Ala Ile Asp Gln Glu Ile Pro Met Tyr Val Gly Thr
 115 120 125

Ser Glu Asp Ile Leu Gln Lys Gly Ala Gly Leu Leu Glu Gly Ala Ser
 130 135 140

Leu Pro Val Gly Gly Glu Asn Thr His Thr Val Ile Thr Ala His Arg
 145 150 155 160

Gly Leu Pro Thr Ala Glu Leu Phe Ser Gln Leu Asp Lys Met Lys Lys
 165 170 175

Gly Asp Ile Phe Tyr Leu His Val Leu Asp Gln Val Leu Ala Tyr Gln
 180 185 190

Val Asp Gln Ile Val Thr Val Glu Pro Asn Asp Phe Glu Pro Val Leu
 195 200 205

Ile Gln His Gly Glu Asp Tyr Ala Thr Leu Leu Thr Cys Thr Pro Tyr
 210 215 220

Met Ile Asn Ser His Arg Leu Leu Val Arg Gly Lys Arg Ile Pro Tyr
 225 230 235 240

Thr Ala Pro Ile Ala Glu Arg Asn Arg Ala Val Arg Glu Arg Gly Gln
 245 250 255

Phe Trp Leu Trp Leu Leu Leu Gly Ala Met Ala Val Ile Leu Leu Leu
 260 265 270

Leu Tyr Arg Val Tyr Arg Asn Arg Arg Ile Val Lys Gly Leu Glu Lys
 275 280 285

Gln Leu Glu Gly Arg His Val Lys Asp
 290 295

<210> 245
 <211> 441
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 245

Met Met Asn Asn Ile Leu Ala Phe Leu Glu Thr Lys Val Ala Pro Phe
 1 5 10 15

Gly Glu Lys Val Gly Asn Gln Arg His Leu Lys Ala Ile Arg Glu Gly
 20 25 30

Phe Met Met Ala Met Pro Leu Ile Leu Val Gly Ser Leu Phe Leu Ile
 35 40 45

Leu Ile Ser Trp Pro Gln Glu Ala Phe Thr Asn Trp Leu Asn Ser Val
 50 55 60

Gly Leu Leu Ser Ile Leu Thr Thr Met Asn Gln Ser Thr Val Ala Ile
 65 70 75 80

Ile Ser Leu Val Ala Cys Phe Gly Ile Ala Tyr Arg Leu Ser Glu Gly
 85 90 95

Tyr Gly Thr Asp Gly Pro Ser Ala Gly Ile Ile Ala Leu Ser Ser Phe
 100 105 110

Val Leu Met Ala Pro Arg Phe Ser Ser Met Val Tyr Asp Lys Asn Gly
 115 120 125

Glu Gln Val Lys Gln Leu Phe Gly Gly Ala Ile Pro Phe Ser Ser Leu
 130 135 140

Asn Ala Ser Ser Leu Phe Met Ala Ile Thr Ile Gly Leu Val Thr Ala
 145 150 155 160

Glu Ile Tyr Arg Met Phe Ile Gln Arg Gly Ile Thr Ile Lys Met Pro
 165 170 175

Ser Gly Val Pro Asp Val Val Ser Lys Ser Phe Ser Ala Leu Leu Ser
 180 185 190

Gly Phe Thr Thr Phe Val Leu Trp Ala Leu Val Leu Lys Gly Leu Glu
 195 200 205
 Ala Ala Gly Val Ala Gly Gly Leu Asn Gly Leu Leu Gly Ala Ile Val
 210 215 220
 Gly Thr Pro Leu Lys Leu Ile Ala Gly Thr Leu Pro Gly Met Ile Leu
 225 230 235 240
 Cys Val Ile Val Asn Ser Phe Phe Trp Phe Cys Gly Val Asn Gly Gly
 245 250 255
 Gln Val Leu Asn Ala Phe Val Asp Pro Val Trp Leu Gln Phe Thr Thr
 260 265 270
 Glu Asn Gln Glu Ala Val Ala Ala Gly Gln Thr Leu Gln His Ile Ile
 275 280 285
 Thr Leu Pro Phe Lys Asp Leu Phe Val Phe Ile Gly Gly Gly Gly Ala
 290 295 300
 Thr Ile Gly Leu Ala Ile Cys Leu Phe Leu Phe Ser Lys Ser Arg Ala
 305 310 315 320
 Asn Lys Thr Leu Gly Lys Leu Ala Ile Ile Pro Ser Ile Phe Asn Ile
 325 330 335
 Asn Thr Ala Ile Leu Phe Thr Phe Pro Thr Val Leu Asn Pro Ile Met
 340 345 350
 Leu Ile Pro Phe Ile Ala Thr Pro Thr Ile Asn Ala Leu Ile Thr Tyr
 355 360 365
 Val Ser Met Ala Val Gly Leu Val Pro Tyr Thr Thr Gly Val Ile Leu
 370 375 380
 Pro Trp Thr Met Pro Pro Ile Ile Gly Gly Phe Leu Ala Thr Gly Ala
 385 390 395 400
 Ser Trp Arg Gly Ala Leu Leu Gln Val Val Leu Ile Leu Val Ser Val
 405 410 415

Ala Ile Tyr Tyr Pro Phe Phe Lys Ile Ala Asp Lys Arg Asn Leu Glu
 420 425 430

Lys Glu Lys Ala Thr Val Gly Gly Lys
 435 440

<210> 246

<211> 559

<212> PRT

<213> Streptococcus pneumoniae

<400> 246

Met Asp Lys Leu Val Ala Ala Ile Glu Lys Gln Gln Gly Lys Phe Glu
 1 5 10 15

Lys Ile Ser Thr Asn Asn Tyr Met Met Ala Ile Lys Asp Gly Phe Ile
 20 25 30

Ala Thr Met Pro Leu Ile Met Phe Ser Ser Phe Leu Met Ile Ile Ile
 35 40 45

Met Ile Pro Lys Asn Phe Gly Val Glu Leu Pro Ser Pro Ala Ile Val
 50 55 60

Trp Met Arg Lys Val Tyr Met Leu Thr Met Gly Val Leu Gly Ile Ile
 65 70 75 80

Val Ser Gly Thr Val Gly Lys Ser Leu Val Gly Asn Val Asn Arg Lys
 85 90 95

Met Pro His Gly Lys Val Ile Asn Asp Ile Ser Ala Met Leu Ala Ala
 100 105 110

Ile Cys Ser Tyr Leu Val Leu Thr Val Thr Leu Val Val Asp Glu Lys
 115 120 125

Thr Gly Ser Thr Ser Leu Ser Thr Asn Tyr Leu Gly Ser Gln Gly Leu
 130 135 140

Ile Thr Ser Phe Val Ser Ala Phe Ile Thr Val Asn Val Tyr Arg Phe
 145 150 155 160

Cys Ile Lys Arg Asp Ile Thr Ile His Leu Pro Lys Glu Val Pro Gly
 165 170 175

Ala Ile Ser Gln Ala Phe Arg Asp Ile Phe Pro Phe Ser Phe Val Leu
 180 185 190

Leu Ile Ser Gly Leu Leu Asp Ile Val Ser Arg Phe Ser Leu Asp Val
 195 200 205

Pro Phe Ala Gln Val Phe Gln Gln Leu Leu Thr Pro Ile Phe Lys Gly
 210 215 220

Ala Glu Ser Tyr Pro Ala Met Met Leu Ile Trp Phe Met Cys Ala Leu
 225 230 235 240

Leu Trp Phe Val Gly Ile His Gly Pro Ser Ile Val Leu Pro Ala Val
 245 250 255

Thr Ala Leu Gln Leu Ser Asn Met Glu Glu Asn Ala Gln Leu Leu Ala
 260 265 270

Asn Gly Gln Phe Pro Tyr His Ser Leu Thr Pro Asn Phe Gly Asn Tyr
 275 280 285

Ile Ala Ala Ile Gly Gly Thr Gly Ala Thr Phe Val Val Pro Phe Ile
 290 295 300

Leu Ile Phe Phe Met Arg Ser Lys Gln Leu Lys Ser Val Gly Lys Ala
 305 310 315 320

Thr Ile Thr Pro Val Leu Phe Ala Val Asn Glu Pro Leu Leu Phe Gly
 325 330 335

Met Pro Val Ile Leu Asn Pro Tyr Leu Phe Val Pro Phe Leu Met Thr
 340 345 350

Pro Pro Val Asn Val Phe Leu Gly Lys Val Phe Ile Asp Phe Phe Gly
 355 360 365

Met Asn Gly Phe Tyr Ile Gln Leu Pro Trp Thr Phe Pro Gly Pro Leu

370 375 380
 Gly Leu Leu Ile Gly Thr Asn Phe Gln Leu Ile Ser Phe Val Phe Leu
 385 390 395 400
 Ser Leu Ile Leu Val Val Asp Ile Leu Ile Tyr Leu Pro Phe Cys Arg
 405 410 415
 Ala Tyr Asp Arg Gln Leu Leu Val Lys Glu Asp Ile Ala Ser Ser Asn
 420 425 430
 Asp Ile Ile Leu Glu Glu Asp Thr Ser Glu Ile Ile Pro Gly Glu Ile
 435 440 445
 Asp Glu Ile Lys Ser Lys Glu Leu Lys Val Leu Val Leu Cys Ala Gly
 450 455 460
 Ser Gly Thr Ser Ala Gln Leu Ala Asn Ala Ile Asn Glu Gly Ala Asn
 465 470 475 480
 Leu Thr Glu Val Arg Val Ile Ala Asn Ser Gly Ala Tyr Gly Ala His
 485 490 495
 Tyr Asp Ile Met Gly Val Tyr Asp Leu Ile Ile Leu Ala Pro Gln Val
 500 505 510
 Arg Ser Tyr Tyr Arg Glu Met Lys Val Asp Ala Glu Arg Leu Gly Ile
 515 520 525
 Gln Ile Val Ala Thr Arg Gly Met Glu Tyr Ile His Leu Thr Lys Ser
 530 535 540
 Pro Ser Lys Ala Leu Gln Phe Val Leu Glu His Tyr Gln Ala Val
 545 550 555
 <210> 247
 <211> 560
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 247
 Met Lys Glu Ala Ile Ile Glu Trp Lys Asp Phe Ser Phe Arg Tyr Glu

1	5	10	15
Thr Gln Gln Glu Pro Thr Leu Gln Gly Ile Asp Leu Thr Ile Tyr Lys	20	25	30
Gly Glu Lys Val Leu Ile Val Gly Pro Ser Gly Ser Gly Lys Ser Thr	35	40	45
Leu Gly Gln Cys Leu Asn Gly Ile Ile Pro Asn Ile Tyr Lys Gly Gln	50	55	60
Thr Tyr Gly Glu Phe Leu Ile Lys Gly Gln Val Ala Phe Asp Met Ser	65	70	75
Ile Tyr Asp Lys Ser His Leu Val Ser Thr Val Leu Gln Asp Thr Asp	85	90	95
Gly Gln Phe Ile Gly Leu Ser Val Ala Glu Asp Leu Ala Phe Ala Leu	100	105	110
Glu Asn Asp Val Thr Ala Leu Asp Glu Met Lys Gly Arg Val Tyr Lys	115	120	125
Trp Ala Glu Lys Leu Asp Leu Leu Pro Leu Leu Asp Gln Arg Pro Gln	130	135	140
Asp Leu Ser Gly Gly Gln Lys Gln Arg Val Ser Leu Ala Gly Val Leu	145	150	155
Ile Asp Glu Ser Pro Ile Leu Leu Phe Asp Glu Pro Leu Ala Asn Leu	165	170	175
Asp Pro Lys Ser Gly Gln Asp Ile Ile Glu Leu Ile Asp Gln Ile His	180	185	190
Lys Glu Glu Gly Thr Thr Thr Leu Ile Ile Glu His Arg Leu Glu Asp	195	200	205
Val Leu His Arg Pro Val Asp Arg Ile Val Leu Ile Asn Asp Gly Arg	210	215	220

Ile Leu Phe Asn Gly Ser Pro Asp Gln Leu Leu Ala Thr Asp Leu Leu
 225 230 235 240

Thr Gln Asn Gly Ile Arg Glu Pro Leu Tyr Leu Thr Thr Leu Arg Gln
 245 250 255

Leu Gly Val Asp Leu Val Lys Glu Glu Gln Leu Ala Asn Leu Asp Asn
 260 265 270

Leu Ser Ile Ser Lys Gly Gln Val Gln Leu Gln Asn Glu Leu Ala Lys
 275 280 285

Glu Thr Pro Ala Leu Gln Ser Leu Phe Arg Leu Glu Glu Val Ser Phe
 290 295 300

Ser Tyr Asp Asp Arg Pro Ile Leu Lys Ser Leu His Leu Asp Ile Lys
 305 310 315 320

Lys Gly Glu Lys Ile Ala Ile Val Gly Lys Asn Gly Ala Gly Lys Ser
 325 330 335

Thr Leu Ala Lys Ala Ile Ser Ser Phe Ile Gln Thr Glu Gly Arg Tyr
 340 345 350

Leu Trp Glu Lys Gln Asp Ile Lys Gly Asp Ser Val Ala Glu Arg Ala
 355 360 365

Glu Arg Val Gly Tyr Val Leu Gln Asn Pro Asn Gln Met Ile Ser Thr
 370 375 380

Asn Met Ile Phe Asp Glu Val Ala Leu Gly Leu Arg Leu Arg Gly Val
 385 390 395 400

Asp Glu Lys Glu Ile Glu Thr Arg Val Tyr Glu Thr Leu Lys Ile Cys
 405 410 415

Gly Leu Tyr Glu Phe Arg Asn Trp Pro Ile Ser Ala Leu Ser Phe Gly
 420 425 430

Gln Lys Lys Arg Val Thr Ile Ala Ser Ile Leu Val Leu Gly Ala Glu
 435 440 445

Ile Ile Leu Leu Asp Glu Pro Thr Ala Gly Gln Asp Gln Lys Asn Tyr
 450 455 460

Thr Glu Ile Met Glu Phe Leu Glu Glu Leu His Gln Lys Gly His Thr
 465 470 475 480

Ile Val Met Ile Thr His Asp Met Gln Leu Met Leu Asp Tyr Ser Asp
 485 490 495

Arg Val Leu Val Met Val Asp Gly Glu Leu Ile Ala Asp Thr Val Pro
 500 505 510

Ala Ser Leu Leu Ser Asp Pro Glu Leu Leu Val Lys Ala Asn Leu Lys
 515 520 525

Glu Thr Ser Ile Phe Asn Leu Ala Lys Lys Leu Asp Val Asp Pro Leu
 530 535 540

Asp Leu Thr Ala Phe Tyr Lys Glu Arg Arg Glu Gly Cys Lys Leu Asn
 545 550 555 560

<210> 248

<211> 543

<212> PRT

<213> Streptococcus pneumoniae

<400> 248

Met Ser Ile Asn Trp Gln Glu Ile Leu Phe His Phe Leu Gly Gly Leu
 1 5 10 15

Gly Leu Phe Leu Tyr Ser Ile Lys Thr Met Gly Asp Gly Leu Gln Gln
 20 25 30

Ala Ala Gly Asp Arg Leu Arg Phe Tyr Ile Asp Lys Tyr Thr Ser Asn
 35 40 45

Pro Phe Phe Gly Val Leu Val Gly Ile Gly Met Thr Ala Leu Ile Gln
 50 55 60

Ser Ser Ser Gly Val Thr Val Ile Thr Val Gly Leu Val Ser Ala Gly
 65 70 75 80

Leu Leu Thr Leu Arg Gln Ala Ile Gly Ile Val Met Gly Ala Asn Ile
 85 90 95

Gly Thr Thr Val Thr Ser Phe Leu Ile Gly Phe Lys Leu Gly Asn Tyr
 100 105 110

Ala Leu Pro Met Leu Phe Ile Gly Ala Val Cys Leu Phe Thr Lys
 115 120 125

Asn Arg Thr Val Asn Asn Ile Gly Arg Ile Leu Phe Gly Val Gly Gly
 130 135 140

Ile Phe Phe Ala Leu Asn Leu Met Ser Gly Ala Met Ala Pro Leu Lys
 145 150 155 160

Asp Leu Gln Val Phe Lys Asp Tyr Met Ile Glu Leu Ser Lys Asn Pro
 165 170 175

Val Leu Gly Val Phe Val Gly Thr Gly Leu Thr Leu Leu Ile Gln Ala
 180 185 190

Ser Ser Ala Thr Ile Gly Ile Leu Gln Asn Leu Tyr Ala Gly Asn Leu
 195 200 205

Ile Asp Leu Gln Gly Ala Leu Pro Val Leu Phe Gly Asp Asn Ile Gly
 210 215 220

Thr Thr Ile Thr Ala Ile Ile Ala Ser Leu Gly Ala Asn Ile Ala Ala
 225 230 235 240

Lys Arg Val Ala Gly Ala His Val Ala Phe Asn Val Ile Gly Thr Val
 245 250 255

Val Cys Val Ile Phe Leu Val Pro Phe Thr Val Leu Ile His Trp Phe
 260 265 270

Glu Ala Thr Leu Asn Leu Ala Pro Glu Met Thr Ile Ala Phe Ala His
 275 280 285

Gly Thr Phe Asn Ile Thr Asn Thr Ile Val Gln Phe Pro Phe Ile Gly
 290 295 300

Ala Leu Ala Tyr Phe Val Thr Lys Ile Ile Pro Gly Glu Asp Glu Val
 305 310 315 320
 Val Lys Tyr Glu Pro Leu Tyr Leu Asp Glu His Phe Ile Lys Gln Ala
 325 330 335
 Pro Ser Ile Ala Leu Gly Asn Ala Lys Lys Glu Leu Leu His Leu Gly
 340 345 350
 Asn Tyr Ala Ala Lys Ala Phe Asp Leu Ser Tyr Lys Tyr Ile Ile Asp
 355 360 365
 Leu Asp Glu Lys Val Ala Glu Lys Gly His Lys Thr Glu Glu Ala Ile
 370 375 380
 Asn Thr Ile Asp Glu Gln Leu Thr Arg Tyr Leu Ile Ala Leu Ser Ser
 385 390 395 400
 Glu Ala Leu Ser Gln Lys Glu Ser Glu Val Leu Thr Asn Ile Leu Asp
 405 410 415
 Ser Ser Arg Asp Leu Glu Arg Ile Gly Asp His Thr Glu Ala Leu Leu
 420 425 430
 Asn Leu Thr Asp Tyr Leu Gln Arg Lys Asn Val Glu Phe Ser Asp Ala
 435 440 445
 Ala Leu Lys Glu Leu Glu Glu Val Tyr Arg Gln Thr Ser Asp Phe Ile
 450 455 460
 Lys Asp Ala Leu Asp Ser Val Glu Asn Asn Asp Ile Glu Lys Ala Arg
 465 470 475 480
 Ser Leu Val Glu Arg His Glu Ala Ile Asn Lys Ile Glu Arg Val Leu
 485 490 495
 Arg Lys Thr His Ile Lys Arg Leu Asn Lys Gly Glu Cys Ser Thr Gln
 500 505 510
 Ala Gly Val Asn Phe Ile Asp Ile Ile Ser His Tyr Thr Arg Val Ser

515 520 525
 Asp His Ala Met Asn Leu Ala Glu Lys Val Phe Ala Glu Gln Ile
 530 535 540

 <210> 249
 <211> 1659
 <212> PRT
 <213> Streptococcus pneumoniae

 <400> 249

 Met Lys Asn Pro Phe Phe Glu Arg Arg Cys Arg Tyr Ser Ile Arg Lys
 1 5 10 15

 Leu Ser Val Gly Ala Cys Ser Leu Met Ile Gly Ala Val Leu Phe Ala
 20 25 30

 Gly Pro Ala Leu Ala Glu Glu Thr Ala Val Pro Glu Asn Ser Gly Ala
 35 40 45

 Asn Thr Glu Leu Val Ser Gly Glu Ser Glu His Ser Thr Asn Glu Ala
 50 55 60

 Asp Lys Gln Asn Glu Gly Glu His Ala Arg Glu Asn Lys Leu Glu Lys
 65 70 75 80

 Ala Glu Gly Val Ala Ile Ala Ser Glu Thr Ala Ser Pro Ala Ser Asn
 85 90 95

 Glu Ala Ala Thr Thr Glu Thr Ala Glu Ala Ala Ser Ala Ala Lys Pro
 100 105 110

 Glu Glu Lys Ala Ser Glu Val Val Ala Glu Thr Pro Ser Ala Glu Ala
 115 120 125

 Lys Pro Lys Ser Asp Lys Glu Thr Glu Ala Lys Pro Glu Ala Thr Asn
 130 135 140

 Gln Gly Asp Glu Ser Lys Pro Ala Ala Glu Ala Asn Lys Thr Glu Lys
 145 150 155 160

 Glu Val Gln Pro Asp Val Pro Lys Asn Thr Glu Lys Thr Leu Lys Pro

165										170										175											
Lys	Glu	Ile	Lys	Phe	Asn	Ser	Trp	Glu	Glu	Leu	Leu	Lys	Trp	Glu	Pro	Lys	Glu	Ile	Lys	Phe	Asn	Ser	Trp	Glu	Glu	Leu	Leu	Lys	Trp	Glu	Pro
180										185										190											
Gly	Ala	Arg	Glu	Asp	Asp	Ala	Ile	Asn	Arg	Gly	Ser	Val	Val	Leu	Ala	Gly	Ala	Arg	Glu	Asp	Asp	Ala	Ile	Asn	Arg	Gly	Ser	Val	Val	Leu	Ala
195										200										205											
Ser	Arg	Arg	Thr	Gly	His	Leu	Val	Asn	Glu	Lys	Ala	Ser	Lys	Glu	Ala	Ser	Arg	Arg	Thr	Gly	His	Leu	Val	Asn	Glu	Lys	Ala	Ser	Lys	Glu	Ala
210										215										220											
Lys	Val	Gln	Ala	Leu	Ser	Asn	Thr	Asn	Ser	Lys	Ala	Lys	Asp	His	Ala	Lys	Val	Gln	Ala	Leu	Ser	Asn	Thr	Asn	Ser	Lys	Ala	Lys	Asp	His	Ala
225										230										235											
Ser	Val	Gly	Gly	Glu	Phe	Lys	Ala	Tyr	Ala	Phe	Asp	Tyr	Trp	Gln	Ala	Ser	Val	Gly	Gly	Glu	Phe	Lys	Ala	Tyr	Ala	Phe	Asp	Tyr	Trp	Gln	Ala
245										250										255											
Tyr	Leu	Asp	Ser	Met	Val	Phe	Trp	Glu	Gly	Leu	Val	Pro	Thr	Pro	Asp	Tyr	Leu	Asp	Ser	Met	Val	Phe	Trp	Glu	Gly	Leu	Val	Pro	Thr	Pro	Asp
260										265										270											
Val	Ile	Asp	Ala	Gly	His	Arg	Asn	Gly	Val	Pro	Val	Tyr	Gly	Thr	Leu	Val	Ile	Asp	Ala	Gly	His	Arg	Asn	Gly	Val	Pro	Val	Tyr	Gly	Thr	Leu
275										280										285											
Phe	Phe	Asn	Trp	Ser	Asn	Ser	Ile	Ala	Asp	Gln	Glu	Arg	Phe	Ala	Glu	Phe	Phe	Asn	Trp	Ser	Asn	Ser	Ile	Ala	Asp	Gln	Glu	Arg	Phe	Ala	Glu
290										295										300											
Ala	Leu	Lys	Gln	Asp	Ala	Asp	Gly	Ser	Phe	Pro	Ile	Ala	Arg	Lys	Leu	Ala	Leu	Lys	Gln	Asp	Ala	Asp	Gly	Ser	Phe	Pro	Ile	Ala	Arg	Lys	Leu
305										310										315											
Val	Asp	Met	Ala	Lys	Tyr	Tyr	Gly	Tyr	Asp	Gly	Tyr	Phe	Ile	Asn	Gln	Val	Asp	Met	Ala	Lys	Tyr	Tyr	Gly	Tyr	Asp	Gly	Tyr	Phe	Ile	Asn	Gln
325										330										335											
Glu	Thr	Thr	Gly	Asp	Leu	Val	Lys	Pro	Leu	Gly	Glu	Lys	Met	Arg	Gln	Glu	Thr	Thr	Gly	Asp	Leu	Val	Lys	Pro	Leu	Gly	Glu	Lys	Met	Arg	Gln
340										345										350											
Phe	Met	Leu	Tyr	Ser	Lys	Glu	Tyr	Ala	Ala	Lys	Val	Asn	His	Pro	Ile	Phe	Met	Leu	Tyr	Ser	Lys	Glu	Tyr	Ala	Ala	Lys	Val	Asn	His	Pro	Ile
355										360										365											
Lys	Tyr	Ser	Trp	Tyr	Asp	Ala	Met	Thr	Tyr	Asn	Tyr	Gly	Arg	Tyr	His	Lys	Tyr	Ser	Trp	Tyr	Asp	Ala	Met	Thr	Tyr	Asn	Tyr	Gly	Arg	Tyr	His
370										375										380											

Gln Asp Gly Leu Gly Glu Tyr Asn Tyr Gln Phe Met Gln Pro Glu Gly
 385 390 395 400
 Asp Lys Val Pro Ala Asp Asn Phe Phe Ala Asn Phe Asn Trp Asp Lys
 405 410 415
 Ala Lys Asn Asp Tyr Thr Ile Ala Thr Ala Asn Trp Ile Gly Arg Asn
 420 425 430
 Pro Tyr Asp Val Phe Ala Gly Leu Glu Leu Gln Gln Gly Gly Ser Tyr
 435 440 445
 Lys Thr Lys Val Lys Trp Asn Asp Ile Leu Asp Glu Asn Gly Lys Leu
 450 455 460
 Arg Leu Ser Leu Gly Leu Phe Ala Pro Asp Thr Ile Thr Ser Leu Gly
 465 470 475 480
 Lys Thr Gly Glu Asp Tyr His Lys Asn Glu Asp Ile Phe Phe Thr Gly
 485 490 495
 Tyr Gln Gly Asp Pro Thr Gly Gln Lys Pro Gly Asp Lys Asp Trp Tyr
 500 505 510
 Gly Ile Ala Asn Leu Val Ala Asp Arg Thr Pro Ala Val Gly Asn Thr
 515 520 525
 Phe Thr Thr Ser Phe Asn Thr Gly His Gly Lys Lys Trp Phe Val Asp
 530 535 540
 Gly Lys Val Ser Lys Asp Ser Glu Trp Asn Tyr Arg Ser Val Ser Gly
 545 550 555 560
 Val Leu Pro Thr Trp Arg Trp Trp Gln Thr Ser Thr Gly Glu Lys Leu
 565 570 575
 Arg Ala Glu Tyr Asp Phe Thr Asp Ala Tyr Asn Gly Gly Asn Ser Leu
 580 585 590
 Lys Phe Ser Gly Asp Val Ala Gly Lys Thr Asp Gln Asp Val Arg Leu
 595 600 605

Tyr Ser Thr Lys Leu Glu Val Thr Glu Lys Thr Lys Leu Arg Val Ala
 610 615 620

His Lys Gly Gly Lys Gly Ser Lys Val Tyr Met Ala Phe Ser Thr Thr
 625 630 635 640

Pro Asp Tyr Lys Phe Asp Asp Ala Asp Ala Trp Lys Glu Leu Thr Leu
 645 650 655

Ser Asp Asn Trp Thr Asn Glu Glu Phe Asp Leu Ser Ser Leu Ala Gly
 660 665 670

Lys Thr Ile Tyr Ala Val Lys Leu Phe Phe Glu His Glu Gly Ala Val
 675 680 685

Lys Asp Tyr Gln Phe Asn Leu Gly Gln Leu Thr Ile Ser Asp Asn His
 690 695 700

Gln Glu Pro Gln Ser Pro Thr Ser Phe Ser Val Val Lys Gln Ser Leu
 705 710 715 720

Lys Asn Ala Gln Glu Ala Glu Ala Val Val Gln Phe Lys Gly Asn Lys
 725 730 735

Asp Ala Asp Phe Tyr Glu Val Tyr Glu Lys Asp Gly Asp Ser Trp Lys
 740 745 750

Leu Leu Thr Gly Ser Ser Ser Thr Thr Ile Tyr Leu Pro Lys Val Ser
 755 760 765

Arg Ser Ala Ser Ala Gln Gly Thr Thr Gln Glu Leu Lys Val Val Ala
 770 775 780

Val Gly Lys Asn Gly Val Arg Ser Glu Ala Ala Thr Thr Thr Phe Asp
 785 790 795 800

Trp Gly Met Thr Val Lys Asp Thr Ser Leu Pro Lys Pro Leu Ala Glu
 805 810 815

Asn Ile Val Pro Gly Ala Thr Val Ile Asp Ser Thr Phe Pro Lys Thr
 820 825 830

Glu Gly Gly Glu Gly Ile Glu Gly Met Leu Asn Gly Thr Ile Thr Ser
 835 840 845
 Leu Ser Asp Lys Trp Ser Ser Ala Gln Leu Ser Gly Ser Val Asp Ile
 850 855 860
 Arg Leu Thr Lys Pro Arg Thr Val Val Arg Trp Val Met Asp His Ala
 865 870 875 880
 Gly Ala Gly Gly Glu Ser Val Asn Asp Gly Leu Met Asn Thr Lys Asp
 885 890 895
 Phe Asp Leu Tyr Tyr Lys Asp Ala Asp Gly Glu Trp Lys Leu Ala Lys
 900 905 910
 Glu Val Arg Gly Asn Lys Ala His Val Thr Asp Ile Thr Leu Asp Lys
 915 920 925
 Pro Ile Thr Ala Gln Asp Trp Arg Leu Asn Val Val Thr Ser Asp Asn
 930 935 940
 Gly Thr Pro Trp Lys Ala Ile Arg Ile Tyr Asn Trp Lys Met Tyr Glu
 945 950 955 960
 Lys Leu Asp Thr Glu Ser Val Asn Ile Pro Met Ala Lys Ala Ala Ala
 965 970 975
 Arg Ser Leu Gly Asn Asn Lys Val Gln Val Gly Phe Ala Asp Val Pro
 980 985 990
 Ala Gly Ala Thr Ile Thr Val Tyr Asp Asn Pro Asn Ser Gln Thr Pro
 995 1000 1005
 Leu Ala Thr Leu Lys Ser Glu Val Gly Gly Asp Leu Ala Ser Ala
 1010 1015 1020
 Pro Leu Asp Leu Thr Asn Gln Ser Gly Leu Leu Tyr Tyr Arg Thr
 1025 1030 1035
 Gln Leu Pro Gly Lys Glu Ile Ser Asn Val Leu Ala Val Ser Val

1040		1045		1050
Pro Lys Asp Asp Arg Arg Ile Lys Ser Val Ser Leu Glu Thr Gly				
1055		1060		1065
Pro Lys Lys Thr Ser Tyr Ala Glu Gly Glu Asp Leu Asp Leu Arg				
1070		1075		1080
Gly Gly Val Leu Arg Val Gln Tyr Glu Gly Gly Thr Glu Asp Glu				
1085		1090		1095
Leu Ile Arg Leu Thr His Ala Gly Val Ser Val Ser Gly Phe Asp				
1100		1105		1110
Thr His His Lys Gly Glu Gln Asn Leu Thr Leu Gln Tyr Leu Gly				
1115		1120		1125
Gln Pro Val Asn Ala Asn Leu Ser Val Thr Val Thr Gly Gln Asp				
1130		1135		1140
Glu Ala Ser Pro Lys Thr Ile Leu Gly Ile Glu Val Ser Gln Glu				
1145		1150		1155
Pro Lys Lys Asp Tyr Leu Val Gly Asp Ser Leu Asp Leu Ser Glu				
1160		1165		1170
Gly Arg Phe Ala Val Ala Tyr Ser Asn Asp Thr Met Glu Glu His				
1175		1180		1185
Ser Phe Thr Asp Glu Gly Val Glu Ile Ser Gly Tyr Asp Ala Gln				
1190		1195		1200
Lys Thr Gly Arg Gln Thr Leu Thr Leu His Tyr Gln Gly His Glu				
1205		1210		1215
Val Ser Phe Asp Val Leu Val Ser Pro Lys Ala Ala Leu Asn Asp				
1220		1225		1230
Glu Tyr Leu Lys Gln Lys Leu Ala Glu Val Glu Ala Ala Lys Asn				
1235		1240		1245

Lys Val	Val Tyr Asn Phe	Ala Ser Ser Glu Val	Lys Glu Ala Phe
1250		1255	1260
Leu Lys	Ala Ile Glu Ala	Ala Glu Gln Val	Leu Lys Asp His Glu
1265		1270	1275
Thr Ser	Thr Gln Asp Gln Val	Asn Asp Arg Leu Asn	Lys Leu Thr
1280		1285	1290
Glu Ala	His Lys Ala Leu	Asn Gly Gln Glu Lys	Phe Thr Glu Glu
1295		1300	1305
Lys Thr	Glu Leu Asp Arg Leu	Thr Gly Glu Val	Gln Glu Leu Leu
1310		1315	1320
Ala Ala	Lys Pro Asn His	Pro Ser Gly Ser Ala	Leu Ala Pro Leu
1325		1330	1335
Leu Glu	Lys Asn Lys Ala	Leu Val Glu Lys Val	Asp Leu Ser Pro
1340		1345	1350
Glu Glu	Leu Thr Thr Ala	Lys Gln Ser Leu Lys	Asp Leu Val Ala
1355		1360	1365
Leu Leu	Lys Glu Asp Lys	Pro Ala Val Phe Ser	Asp Ser Lys Thr
1370		1375	1380
Gly Val	Glu Val His Phe	Ser Asn Lys Glu Lys	Thr Val Ile Lys
1385		1390	1395
Gly Leu	Lys Val Glu Arg	Val Gln Ala Ser Ala	Glu Glu Lys Lys
1400		1405	1410
Tyr Phe	Ala Gly Glu Asp	Ala His Val Phe Glu	Ile Glu Gly Leu
1415		1420	1425
Asp Glu	Lys Gly Gln Asp	Val Asp Leu Ser Tyr	Ala Ser Ile Val
1430		1435	1440
Lys Ile	Pro Ile Glu Lys	Asp Lys Lys Val Lys	Lys Val Phe Phe
1445		1450	1455

Leu Pro	Glu Gly Lys Glu	Ala Val Glu Leu	Ala Phe	Glu Gln Thr
1460		1465		1470
Asp Ser	His Val Ile Phe Thr	Ala Pro His Phe Thr	His Tyr Ala	
1475		1480		1485
Phe Val	Tyr Glu Ser Ala Glu	Lys Pro Gln Pro	Ala Lys Pro	Ala
1490		1495		1500
Pro Gln	Asn Thr Val Leu Pro	Lys Pro Thr Tyr	Gln Pro Thr Ser	
1505		1510		1515
Asp Gln	Gln Lys Ala Pro Lys	Leu Glu Val Gln	Glu Glu Lys Val	
1520		1525		1530
Ala Phe	His Arg Gln Glu His	Glu Asn Thr Glu Met	Leu Val Gly	
1535		1540		1545
Glu Gln	Arg Val Ile Ile Gln	Gly Arg Asp Gly Leu	Leu Arg His	
1550		1555		1560
Val Phe	Glu Val Asp Glu Asn	Gly Gln Arg Arg Leu	Arg Ser Thr	
1565		1570		1575
Glu Val	Ile Gln Glu Ala Ile	Pro Glu Ile Val Glu	Ile Gly Thr	
1580		1585		1590
Lys Val	Lys Thr Val Pro Ala	Val Val Ala Thr Gln	Glu Lys Pro	
1595		1600		1605
Ala Gln	Asn Thr Ala Val Lys	Ser Glu Glu Ala Ser	Lys Gln Leu	
1610		1615		1620
Pro Asn	Thr Gly Thr Ala Asp	Ala Asn Glu Ala Leu	Ile Ala Gly	
1625		1630		1635
Leu Ala	Ser Leu Gly Leu Ala	Ser Leu Ala Leu Thr	Leu Arg Arg	
1640		1645		1650
Lys Arg	Glu Asp Lys Asp			
1655				

<210> 250
 <211> 320
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 250

Met Val Thr Ile Ile Asn Ile Gly Gly Ser Tyr Tyr Leu Gln Gly Ile
 1 5 10 15

Leu Asp Glu Tyr Ile Pro Asn Gln Met Lys Ser Thr Leu Gly Ile Ile
 20 25 30

Ser Val Gly Leu Val Ile Thr Tyr Ile Leu Gln Gln Val Met Ser Phe
 35 40 45

Ser Arg Asp Tyr Leu Leu Thr Val Leu Ser Gln Arg Leu Ser Ile Asp
 50 55 60

Val Ile Leu Ser Tyr Ile Arg His Ile Phe Glu Leu Pro Met Ser Phe
 65 70 75 80

Phe Ala Thr Arg Arg Thr Gly Glu Ile Ile Ser Arg Phe Thr Asp Ala
 85 90 95

Asn Ser Ile Ile Asp Ala Leu Ala Ser Thr Ile Leu Ser Leu Phe Leu
 100 105 110

Asp Val Ser Ile Leu Ile Leu Val Gly Gly Val Leu Leu Ala Gln Asn
 115 120 125

Pro Asn Leu Phe Leu Leu Ser Leu Ile Ser Ile Pro Ile Tyr Met Phe
 130 135 140

Ile Ile Phe Ser Phe Met Lys Pro Phe Glu Lys Met Asn His Asp Val
 145 150 155 160

Met Gln Ser Asn Ser Met Val Ser Ser Ala Ile Ile Glu Asp Ile Asn
 165 170 175

Gly Ile Glu Thr Ile Lys Ser Leu Thr Ser Glu Glu Asn Arg Tyr Gln
 180 185 190

Asn Ile Asp Ser Glu Phe Val Asp Tyr Leu Glu Lys Ser Phe Lys Leu
 195 200 205

Ser Lys Tyr Ser Ile Leu Gln Thr Ser Leu Lys Gln Gly Thr Lys Leu
 210 215 220

Val Leu Asn Ile Leu Ile Leu Trp Phe Gly Ala Gln Leu Val Met Ser
 225 230 235 240

Ser Lys Ile Ser Ile Gly Gln Leu Ile Thr Phe Asn Thr Leu Phe Ser
 245 250 255

Tyr Phe Thr Thr Pro Met Glu Asn Ile Ile Asn Leu Gln Thr Lys Leu
 260 265 270

Gln Ser Ala Lys Val Ala Asn Asn Arg Leu Asn Glu Val Tyr Leu Val
 275 280 285

Glu Ser Glu Phe Gln Val Gln Glu Asn Pro Val His Ser His Phe Leu
 290 295 300

Met Gly Asp Ile Glu Phe Asp Asp Leu Ser Tyr Lys Tyr Gly Phe Gly
 305 310 315 320

<210> 251

<211> 77

<212> PRT

<213> Streptococcus pneumoniae

<400> 251

Met Tyr Lys His Leu Phe Phe Leu Asp Ser Lys Thr Leu Asp Arg Leu
 1 5 10 15

Thr Pro Tyr Ile Leu Val Leu Ala Ser Asp Thr Ile Ala Phe Asn Val
 20 25 30

Phe Val Leu Thr Phe Val Ser Ala Val Val Phe Asn Phe Leu Asn Ser
 35 40 45

Met Leu Ala Leu Met Ala Ile Phe Ile Gly Ala Gly Tyr Val Val Gly
 50 55 60

Phe Trp Leu Leu Ile Leu Asn Glu Asn Gln Arg Ala Asn
 65 70 75

<210> 252
 <211> 203
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 252

Met Glu Phe Phe Asp Lys Phe His Ala Leu Cys Phe Gly Phe Leu Val
 1 5 10 15

Leu Ile Ile Val Ile Thr Val Pro Tyr Thr Ile Asn His Gly Gly Phe
 20 25 30

Phe Gln Asn Glu Ser Ala Leu Ile Leu Val Ser Leu Leu Val Thr Ser
 35 40 45

Leu Ser Val Ala Tyr Ala Arg Lys Phe Glu Met Ile Ser Phe Gly Met
 50 55 60

Leu Ser Lys Lys Gln Leu Leu Phe Ile Ala Ile Phe Leu Leu Ser
 65 70 75 80

Val Leu Glu Thr Leu Val Tyr Ile His Phe Phe Ala Val Ser Ser Gly
 85 90 95

Ser Gly Val Gln His Leu Ala Glu Val Ser Arg Gly Ile Ser Leu Ser
 100 105 110

Leu Ile Leu Thr Thr Ser Val Phe Gly Pro Ile Gln Glu Glu Leu Ile
 115 120 125

Phe Arg Gly Leu Leu Gln Gly Ala Val Phe Asp Asn Ser Trp Leu Gly
 130 135 140

Leu Val Leu Thr Ser Ser Leu Phe Ser Phe Met His Gly Pro Ser Asn
 145 150 155 160

Val Pro Ser Phe Ile Phe Tyr Leu Leu Gly Gly Leu Leu Leu Gly Phe
 165 170 175

Ala Tyr Lys Lys Ser Gln Asn Leu Trp Val Ser Thr Leu Val His Met
 180 185 190

Leu Tyr Asn Ser Trp Pro Leu Leu Tyr Tyr Leu
 195 200

<210> 253
 <211> 612
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 253

Met Ser Tyr Lys Asp Thr Val Gln Lys Ile Leu Asp Val Ile Gly Gly
 1 5 10 15

Glu Lys Asn Val Asn Arg Val Thr His Cys Val Thr Arg Leu Arg Leu
 20 25 30

Glu Leu Lys Asp Glu Asn Leu Val Asn Asp Asp Val Lys Lys Ile
 35 40 45

Pro Gly Val Ile Gly Ile Met Lys Lys Asn Gly Gln Tyr Gln Ile Ile
 50 55 60

Leu Gly Asn Asp Val Ala Asn Tyr Tyr Lys Glu Phe Val Lys Leu Gly
 65 70 75 80

Asn Phe Glu Ser Asp Ser Val Val Gln Gly His Lys Gly Asn Ile Leu
 85 90 95

Glu Arg Ile Ile Glu Tyr Ile Ala Gly Ser Met Thr Pro Ile Ile Pro
 100 105 110

Ala Met Leu Gly Gly Gly Met Leu Lys Val Leu Val Ile Ile Leu Pro
 115 120 125

Met Leu Gly Ile Leu Gln Ser Asp Ser Gln Thr Ile Ala Phe Leu Thr
 130 135 140

Phe Phe Gly Asp Ala Pro Tyr Tyr Phe Leu Pro Leu Leu Leu Ala Tyr
 145 150 155 160

Ser Ala Ser Gln Lys Leu Lys Val Thr Ser Thr Leu Ala Met Ser Val
 165 170 175
 Ala Gly Val Leu Leu His Pro Asn Phe Val Gln Met Val Gln Ser Gly
 180 185 190
 Asn Pro Leu Ser Leu Phe Gly Ala Pro Val Thr Pro Ala Ser Tyr Gly
 195 200 205
 Ser Ser Val Val Pro Ile Leu Ile Met Val Trp Leu Met Lys Tyr Ile
 210 215 220
 Glu Lys Ile Ile Ala Lys Leu Thr Leu Ala Ile Thr Lys Ser Phe Leu
 225 230 235 240
 Gln Pro Thr Leu Val Leu Leu Val Ser Ser Cys Ile Ala Leu Val Val
 245 250 255
 Val Gly Pro Ile Gly Val Ile Val Gly Glu Gly Leu Ser Asn Leu Val
 260 265 270
 Gly Gln Met Tyr Gly Val Ala Gly Trp Leu Thr Leu Ala Ile Leu Gly
 275 280 285
 Ala Ile Met Pro Phe Ile Val Met Thr Gly Met His Trp Ala Phe Ala
 290 295 300
 Pro Ile Phe Leu Ala Ala Ser Ile Ala Thr Pro Asp Val Leu Ile Leu
 305 310 315 320
 Pro Ala Met Leu Gly Ser Asn Leu Ala Gln Gly Ala Ala Ser Met Ala
 325 330 335
 Val Ala Leu Lys Ser Lys Asn Asn Asn Thr Lys Gln Ile Ala Phe Ala
 340 345 350
 Ala Gly Phe Ser Ala Leu Leu Ala Gly Ile Thr Glu Pro Ala Leu Tyr
 355 360 365
 Gly Val Thr Leu Lys Tyr Lys Lys Pro Leu Tyr Ala Ala Met Ile Gly

370	375	380
Gly Gly Leu Ala Gly Leu Phe Ala Gly Leu Thr Ser Val Lys Ala Tyr 385 390		400
Leu Phe Ala Val Pro Ser Leu Ile Ala Leu Pro Gln Phe Ile Tyr Ser 405 410		415
Asp Val Pro Ser Asn Ile Val Asn Ala Leu Ile Val Ala Val Ile Ser 420 425		430
Val Val Ile Thr Phe Val Leu Ala Tyr Ile Phe Gly Ile Asp Glu Glu 435 440		445
Glu Ser Ser Ser Asn Leu Glu Val Glu Ala Gly Val Ser Asn Lys Lys 450 455		460
Met Ile Phe Ser Pro Ile Ser Gly Glu Ile Ile Pro Leu Ser Asp Val 465 470		475 480
Gln Asp Lys Thr Phe Ser Asp Lys Leu Ile Gly Asp Gly Val Ala Ile 485 490		495
Ile Pro Ser Glu Gly Lys Val Tyr Ala Pro Phe Asp Gly Lys Ile Thr 500 505		510
Asn Ile Phe Pro Thr Lys His Ala Ile Gly Leu Lys Ser Asp Glu Gly 515 520		525
Val Glu Leu Leu Ile His Ile Gly Leu Asp Thr Val Glu Leu Lys Gly 530 535		540
Gln Gly Phe Ile Ser His Val Glu Glu Gly Asp Arg Val Phe Lys Asn 545 550		555 560
Gln Leu Ile Phe Glu Met Asp Leu Asn Leu Ile Lys Thr Lys Gly Tyr 565 570		575
Glu Thr Val Thr Pro Val Ile Val Thr Asn Thr Asn Asp Phe Leu Asp 580 585		590

Val Leu Val Leu Pro Asn Asn Gln Thr Ile Glu His Ser Lys Glu Leu
 595 600 605

Leu Val Ile Leu
 610

<210> 254
 <211> 75
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 254

Met Val Gly Ile Ala Lys Ser Phe Trp Ile Lys Ser Ala Lys Arg Thr
 1 5 10 15

Val Val Ser Leu Ile Leu Asn Leu Leu Leu Ala Val Thr Leu Ile
 20 25 30

Lys Trp Gly Ala Asn Ser Cys Ile Ser Cys Lys Ala Glu Ile Met Leu
 35 40 45

Ser Leu Pro Thr Ala Gly Phe Gly Gly Asn Thr Ser Asn Glu Ser Asp
 50 55 60

Gly Val Trp Arg Asp Ile Cys Asn Asn Leu Phe
 65 70 75

<210> 255
 <211> 219
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 255

Met Glu Ser Ile Leu Glu Val Leu Thr Pro Asp Asn Leu Val Phe Ile
 1 5 10 15

Phe Lys Gly Phe Gly Leu Thr Leu Tyr Ile Ser Leu Ile Ala Ile Ile
 20 25 30

Leu Ser Thr Ile Ile Gly Thr Val Leu Ala Val Thr Arg Asn Gly Lys
 35 40 45

Asn Pro Val Leu Arg Ile Ile Ser Ser Ile Tyr Ile Glu Phe Val Arg

50		55		60
Asn Val Pro Asn Leu Leu Trp Ile Phe Thr Ile Phe Leu Val Phe Lys				
65		70		80
Met Lys Ser Thr Pro Ala Gly Ile Thr Ala Phe Thr Leu Phe Thr Ser				
	85		90	95
Ala Ala Leu Ala Glu Ile Ile Arg Gly Gly Leu Asn Ala Val Asp Lys				
	100		105	110
Gly Gln Tyr Glu Ala Gly Met Ser Gln Gly Phe Thr Ser Ala Gln Ile				
	115		120	125
Leu Tyr Tyr Ile Ile Leu Pro Gln Ala Ile Arg Lys Met Leu Pro Ala				
	130		135	140
Ile Ile Ser Gln Phe Val Thr Val Ile Lys Asp Thr Ser Leu Leu Tyr				
	145		150	155
Ser Val Ile Ala Leu Gln Glu Leu Phe Gly Ala Ser Gln Ile Leu Met				
	165		170	175
Gly Arg Tyr Phe Glu Pro Glu Gln Val Phe Ser Leu Tyr Ile Leu Ile				
	180		185	190
Ala Leu Ile Tyr Phe Ser Phe Asn Leu Ala Ile Ser Ser Leu Ser His				
	195		200	205
Met Leu Ala Lys Arg Trp Gln Gln Ala Ala Glu				
	210		215	
<210> 256				
<211> 252				
<212> PRT				
<213> Streptococcus pneumoniae				
<400> 256				
Met Ala Leu Val Glu Phe Lys Asn Val Glu Lys Tyr Tyr Gly Asp Tyr				
1	5		10	15
His Ala Phe Arg Asn Ile Asn Leu Arg Phe Glu Lys Gly Gln Val Val				

20	25	30
Val Leu Leu Gly Pro Ser Gly Ser Gly Lys Ser Thr Leu Ile Arg Thr 35	40	45
Ile Asn Gly Leu Glu Thr Val Asp Lys Gly Ser Leu Leu Val Asn Gly 50	55	60
His Gln Val Ala Gly Ala Ser Gln Lys Asp Leu Val Pro Leu Arg Lys 65	70	75
Glu Val Gly Met Val Phe Gln His Phe Asn Leu Tyr Pro His Lys Ala 85	90	95
Val Leu Glu Asn Val Thr Leu Ala Pro Ile Glu Val Leu Gly Ile Asp 100	105	110
Lys Lys Glu Ala Glu Lys Thr Ala Gln Lys Tyr Leu Glu Phe Val Asn 115	120	125
Met Trp Asp Lys Lys Asp Ser Tyr Pro Ala Met Leu Ser Gly Gly Gln 130	135	140
Lys Gln Arg Ile Ala Ile Ala Arg Gly Leu Ala Met His Pro Glu Leu 145	150	155
Leu Leu Phe Asp Glu Pro Thr Ser Ala Leu Asp Pro Glu Thr Ile Gly 165	170	175
Asp Val Leu Ala Val Met Gln Lys Leu Ala His Asp Gly Met Asn Met 180	185	190
Ile Ile Val Thr His Glu Met Gly Phe Ala Arg Glu Val Ala Asp Arg 195	200	205
Ile Ile Phe Met Ala Asp Gly Glu Val Leu Val Asp Thr Thr Asp Val 210	215	220
Asp Asn Phe Phe Asp Asn Pro Ser Glu Pro Arg Ala Gln Gln Phe Leu 225	230	235
		240

Ser Lys Ile Ile Asn His Glu Ser Asp Lys Val Lys
 245 250

<210> 257

<211> 406

<212> PRT

<213> Streptococcus pneumoniae

<400> 257

Met Tyr Arg Tyr Gln Ile Gly Ile Pro Thr Leu Glu Tyr Asp Gln Phe
 1 5 10 15

Val Lys Glu His Glu Leu Ala Asn Val Leu Gln Ser Ser Ala Trp Glu
 20 25 30

Glu Val Lys Ser Asn Trp Gln His Glu Lys Phe Gly Val Tyr Arg Glu
 35 40 45

Glu Lys Leu Leu Ala Thr Ala Ser Ile Leu Ile Arg Thr Leu Pro Leu
 50 55 60

Gly Tyr Lys Met Phe Tyr Ile Pro Arg Gly Pro Ile Leu Asp Tyr Gly
 65 70 75 80

Asp Lys Glu Leu Leu Asn Phe Ala Ile Gln Ser Ile Lys Ser Tyr Ala
 85 90 95

Arg Ser Lys Arg Ala Val Phe Val Thr Phe Asp Pro Ser Ile Cys Leu
 100 105 110

Ser Gln Ser Leu Ile Asn Gln Glu Lys Thr Glu Phe Pro Glu Asn Leu
 115 120 125

Ala Ile Ile Asp Ser Leu Gln Gln Met Gly Val Arg Trp Ser Gly Lys
 130 135 140

Thr Glu Glu Met Gly Asp Thr Ile Gln Pro Arg Ile Gln Ala Lys Ile
 145 150 155 160

Tyr Lys Glu Asn Phe Glu Glu Asp Lys Leu Ser Lys Ser Thr Lys Gln
 165 170 175

Ala Ile Arg Thr Ala Arg Asn Lys Gly Leu Glu Ile Gln Tyr Gly Gly
180 185 190

Leu Glu Leu Leu Asp Ser Phe Ser Glu Leu Met Lys Lys Thr Glu Lys
195 200 205

Arg Lys Glu Ile His Leu Arg Asn Glu Ala Tyr Tyr Lys Lys Leu Leu
210 215 220

Asp Asn Phe Lys Asp Lys Ala Tyr Ile Thr Leu Ala Thr Leu Asp Val
225 230 235 240

Ser Lys Arg Ser Gln Glu Leu Glu Glu Gln Leu Ala Lys Asn Arg Ala
245 250 255

Leu Glu Glu Thr Phe Thr Glu Ser Thr Arg Thr Ser Lys Val Glu Ala
260 265 270

Gln Lys Lys Glu Lys Glu Arg Leu Leu Glu Glu Leu Thr Phe Leu Gln
275 280 285

Glu Tyr Ile Asp Val Gly Gln Ala Arg Val Pro Leu Ala Ala Thr Leu
290 295 300

Ser Leu Glu Phe Gly Thr Thr Ser Val Asn Ile Tyr Ala Gly Met Asp
305 310 315 320

Asp Asp Phe Lys Arg Tyr Asn Ala Pro Ile Leu Thr Trp Tyr Glu Thr
325 330 335

Ala Arg Tyr Ala Phe Glu Arg Gly Met Ile Trp Gln Asn Leu Gly Gly
340 345 350

Val Glu Asn Ser Leu Asn Gly Gly Leu Tyr His Phe Lys Glu Lys Phe
355 360 365

Asn Pro Thr Ile Glu Glu Tyr Leu Gly Glu Phe Thr Met Pro Thr His
370 375 380

Pro Leu Tyr Pro Leu Leu Arg Leu Ala Leu Asp Phe Arg Lys Thr Leu
385 390 395 400

Arg Lys Lys His Arg Lys
405

<210> 258
<211> 194
<212> FRT
<213> Streptococcus pneumoniae

<400> 258

Met Lys Glu Ile Phe Met Ala Lys Lys Gly Thr Leu Thr Gly Leu Leu
1 5 10 15

Leu Phe Gly Ile Phe Phe Gly Ala Gly Asn Leu Ile Phe Pro Pro Ser
20 25 30

Leu Gly Ala Leu Ser Gly Glu His Phe Leu Pro Ala Ile Ala Gly Phe
35 40 45

Val Phe Ser Gly Val Gly Ile Ala Val Leu Thr Leu Ile Ile Gly Thr
50 55 60

Leu Asn Pro Lys Gly Tyr Ile Tyr Glu Ile Ser Thr Lys Ile Ala Pro
65 70 75 80

Trp Phe Ala Thr Leu Tyr Leu Ser Val Leu Tyr Leu Ser Ile Gly Pro
85 90 95

Phe Phe Ala Thr Pro Arg Thr Ala Thr Thr Ala Tyr Glu Val Gly Ile
100 105 110

Ser Pro Leu Leu Ser Asp Ala Asn Lys Gly Leu Gly Leu Ile Val Phe
115 120 125

Thr Val Leu Tyr Phe Ala Ala Ala Tyr Leu Ile Ser Leu Asn Pro Ser
130 135 140

Lys Ile Leu Asp Arg Ile Gly Arg Ile Leu Thr Pro Val Phe Ala Ile
145 150 155 160

Leu Ile Val Ile Leu Val Val Leu Gly Ala Ile Lys Tyr Gly Gly Thr
165 170 175

Ser Pro Gln Ala Ala Ser Leu Leu Ile Lys Leu Leu Pro Leu Val Gln
 180 185 190

Val Ser

<210> 259

<211> 561

<212> PRT

<213> Streptococcus pneumoniae

<400> 259

Met Lys Gly Gly Thr Pro Gly Val Tyr Ile Leu Ser Gln Ala Thr Gln
 1 5 10 15

Glu Ile Phe Gly Ser Thr Ala Gln Leu Phe Leu Ala Ala Met Val Thr
 20 25 30

Val Thr Cys Phe Thr Thr Thr Val Gly Leu Ile Val Ser Thr Ala Glu
 35 40 45

Phe Phe Asn Glu Arg Phe Pro Gln Ile Ser Tyr Lys Val Tyr Ala Thr
 50 55 60

Ala Phe Thr Leu Ile Gly Phe Ala Ile Ala Asn Leu Gly Leu Asp Ala
 65 70 75 80

Ile Ile Lys Tyr Ser Ile Pro Val Leu Val Ile Leu Tyr Pro Ile Thr
 85 90 95

Ile Ala Ile Val Met Ile Val Ile Val Asn Lys Phe Val Ala Leu Ser
 100 105 110

Lys Pro Gly Met Gln Leu Thr Ile Ala Val Val Thr Val Ile Ala Ile
 115 120 125

Ala Ser Val Leu Gly Ser Ser Leu Arg Leu Ser Phe Leu Gln Ile Leu
 130 135 140

Leu Ala Phe Phe Leu Leu Pro Arg His Leu Ser His Gly Trp Cys Gln
 145 150 155 160

Pro Leu Leu Glu Ser Cys Ser His Trp Phe Tyr Gln Thr Ser Lys Lys
 165 170 175

Ala Met Phe Leu Lys Trp Asn Asn His Leu Asn His Phe Cys Ser Gln
 180 185 190

Val Tyr Arg Ser Asp Phe Leu Phe Leu Ser Asp Asp Lys Cys Val Ile
 195 200 205

Ile Gly Ser Glu Arg Gly Glu Glu Met Asn Gln Thr Val Glu Tyr Ile
 210 215 220

Lys Glu Leu Thr Ala Ile Ala Ser Pro Thr Gly Phe Thr Arg Glu Ile
 225 230 235 240

Ala Asp Tyr Leu Val Lys Thr Leu Glu Gly Phe Gly Tyr Gln Pro Val
 245 250 255

Arg Thr Ser Lys Gly Gly Val Asn Val Thr Ile Lys Gly Gln Asn Asp
 260 265 270

Glu Gln His Arg Tyr Val Thr Ala His Val Asp Thr Leu Gly Ala Ile
 275 280 285

Val Arg Ala Val Lys Pro Asp Gly Arg Leu Lys Met Asp Arg Ile Gly
 290 295 300

Gly Phe Pro Trp Asn Met Ile Glu Gly Glu Asn Cys Thr Ile His Val
 305 310 315 320

Ala Ser Thr Gly Glu Lys Val Ser Gly Thr Ile Leu Ile His Gln Thr
 325 330 335

Ser Cys His Val Tyr Lys Asp Ala Gly Thr Ala Glu Arg Thr Gln Asp
 340 345 350

Asn Met Glu Val Arg Leu Asp Ala Lys Val Thr Ser Glu Lys Glu Thr
 355 360 365

Arg Ala Leu Gly Ile Glu Val Gly Asp Phe Ile Ser Phe Asp Pro Arg
 370 375 380

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Thr Val Val Thr Glu Thr Gly Phe Ile Lys Ser Arg His Leu Asp Asp
385                      390                      395                      400

Lys Val Ser Ala Ala Ile Leu Leu Asn Leu Leu Arg Ile Tyr Lys Glu
                      405                      410                      415

Glu Lys Ile Glu Leu Pro Val Thr Thr His Phe Ala Phe Ser Val Phe
                      420                      425                      430

Glu Glu Val Gly His Gly Ala Asn Ser Asn Ile Pro Ala Gln Val Val
                      435                      440                      445

Glu Tyr Leu Ala Val Asp Met Gly Ala Met Gly Asp Asp Gln Gln Thr
450                      455                      460

Asp Glu Tyr Thr Val Ser Ile Cys Val Lys Asp Ala Ser Gly Pro Tyr
465                      470                      475                      480

His Tyr Asp Phe Arg Gln His Leu Val Ala Leu Ala Lys Glu Gln Asp
                      485                      490                      495

Ile Pro Phe Lys Leu Asp Ile Tyr Pro Phe Tyr Gly Ser Asp Ala Ser
                      500                      505                      510

Ala Ala Met Ser Ala Gly Ala Glu Val Lys His Ala Leu Leu Gly Ala
515                      520                      525

Gly Ile Glu Ser Ser His Ser Tyr Glu Arg Thr His Ile Asp Ser Val
530                      535                      540

Ile Ala Thr Glu Arg Met Val Asp Ala Tyr Leu Lys Ser Thr Leu Val
545                      550                      555                      560

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Asp

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<210> 260
<211> 330
<212> PRT
<213> Streptococcus pneumoniae

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<400> 260

Met Ala Met Ile Glu Val Glu His Leu Gln Lys Asn Phe Val Lys Thr
 1 5 10 15

Val Lys Glu Pro Gly Leu Lys Gly Ala Leu Arg Ser Phe Ile His Pro
 20 25 30

Glu Lys Gln Thr Phe Glu Ala Val Lys Asp Leu Thr Phe Glu Val Pro
 35 40 45

Lys Gly Gln Ile Leu Gly Phe Ile Gly Ala Asn Gly Ala Gly Lys Ser
 50 55 60

Thr Thr Ile Lys Met Leu Thr Gly Ile Leu Lys Pro Thr Ser Gly Phe
 65 70 75 80

Cys Arg Ile Asn Gly Lys Ile Pro Gln Asp Asn Arg Gln Asp Tyr Val
 85 90 95

Lys Asp Ile Gly Val Val Phe Gly Gln Arg Thr Gln Leu Trp Trp Asp
 100 105 110

Leu Ala Leu Gln Glu Thr Tyr Thr Val Leu Lys Glu Ile Tyr Asp Val
 115 120 125

Pro Asp Ser Leu Phe His Lys Arg Met Asp Phe Leu Asn Glu Val Leu
 130 135 140

Asp Leu Lys Asp Phe Ile Lys Asp Pro Val Arg Thr Leu Ser Leu Gly
 145 150 155 160

Gln Arg Met Arg Ala Asp Ile Ala Ala Ser Leu Leu His Asn Pro Lys
 165 170 175

Val Leu Phe Leu Asp Glu Pro Thr Ile Gly Leu Asp Val Ser Val Lys
 180 185 190

Asp Asn Ile Arg Arg Ala Ile Thr Gln Ile Asn Gln Glu Glu Glu Thr
 195 200 205

Thr Ile Leu Leu Thr Thr His Asp Leu Ser Asp Ile Glu Gln Leu Cys

210 215 220
 Asp Arg Ile Phe Met Ile Asp Lys Gly Gln Glu Ile Phe Asp Gly Thr
 225 230 235 240
 Val Ser Gln Leu Lys Glu Thr Phe Gly Lys Met Lys Thr Leu Ser Phe
 245 250 255
 Glu Leu Leu Pro Gly Gln Ser His Leu Val Ser His Tyr Asp Gly Leu
 260 265 270
 Ser Asp Met Thr Ile Asp Arg Gln Gly Asn Ser Leu Asn Ile Glu Phe
 275 280 285
 Asp Ser Ser Arg Tyr Gln Ser Ala Asp Ile Ile Lys Gln Thr Leu Ser
 290 295 300
 Asp Phe Glu Ile Arg Asp Leu Lys Met Val Asp Thr Asp Ile Glu Asp
 305 310 315 320
 Ile Ile Arg Arg Phe Tyr Arg Lys Glu Leu
 325 330
 <210> 261
 <211> 491
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 261
 Met Asp Ala Ile Phe Asp Leu Ile Gly Lys Val Phe Asn Pro Ile Leu
 1 5 10 15
 Glu Met Gly Gly Pro Val Ile Met Leu Ile Ile Leu Thr Val Leu Ala
 20 25 30
 Leu Leu Phe Gly Val Lys Phe Ser Lys Ala Leu Glu Gly Gly Ile Lys
 35 40 45
 Leu Ala Ile Ala Leu Thr Gly Ile Gly Ala Ile Ile Gly Met Leu Asn
 50 55 60
 Thr Ala Phe Ser Ala Ser Leu Ala Lys Phe Val Glu Asn Thr Gly Ile

65		70		75		80
Gln Leu Ser Ile Thr Asp Val Gly Trp Ala Pro Leu Ala Thr Ile Thr						
	85			90		95
Trp Gly Ser Ala Trp Thr Leu Tyr Phe Leu Leu Ile Met Leu Ile Val						
	100		105		110	
Asn Ile Val Met Leu Ala Met Lys Lys Thr Asp Thr Leu Asp Val Asp						
	115	120		125		
Ile Phe Asp Ile Trp His Leu Ser Ile Thr Gly Leu Leu Ile Lys Trp						
	130	135		140		
Tyr Ala Asp Asn Asn Gly Val Ser Gln Gly Val Ser Leu Phe Ile Ala						
	145	150		155		160
Thr Ala Ala Ile Val Leu Val Gly Val Leu Lys Ile Ile Asn Ser Asp						
	165		170		175	
Leu Met Lys Pro Thr Phe Asp Asp Leu Leu Asn Ala Pro Ser Ser Ser						
	180		185		190	
Pro Met Thr Ser Thr His Met Asn Tyr Met Met Asn Pro Val Ile Met						
	195	200		205		
Val Leu Asp Lys Ile Phe Glu Lys Phe Phe Pro Gly Leu Asp Lys Tyr						
	210	215		220		
Asp Phe Asp Ala Ala Lys Leu Asn Lys Lys Ile Gly Phe Trp Gly Ser						
	225	230		235		240
Lys Phe Phe Ile Gly Phe Ile Leu Gly Ile Val Ile Gly Ile Met Gly						
	245		250		255	
Thr Pro His Pro Ile Ala Gly Val Ala Asp Ala Asp Lys Trp Arg Leu						
	260		265		270	
Val Ile Lys Gly Trp Leu Ser Leu Gly Leu Thr Ala Gly Val Ser Leu						
	275	280		285		

Glu Leu Phe Ser Leu Ile Gly Ser Trp Phe Ile Ala Ala Val Glu Pro
 290 295 300

Leu Ser Gln Gly Ile Thr Asn Val Ala Thr Lys Arg Leu Gln Gly Arg
 305 310 315 320

Lys Phe Asn Ile Gly Leu Asp Trp Pro Phe Ile Ala Gly Arg Ala Glu
 325 330 335

Ile Trp Ala Cys Ala Asn Val Leu Ala Pro Ile Met Leu Ile Glu Ala
 340 345 350

Val Leu Leu Ser Lys Val Gly Asn Gly Ile Leu Pro Leu Ala Gly Ile
 355 360 365

Ile Ala Met Gly Val Thr Pro Ala Leu Leu Val Val Thr Arg Gly Lys
 370 375 380

Leu Leu Arg Met Ile Ile Phe Gly Thr Leu Leu Leu Pro Leu Phe Leu
 385 390 395 400

Leu Ser Gly Thr Leu Ile Ala Pro Phe Ala Thr Glu Leu Ala Lys Gly
 405 410 415

Val Gly Ala Phe Pro Glu Gly Val Ser Gln Thr Gln Leu Ile Thr His
 420 425 430

Ser Thr Leu Glu Gly Pro Ile Glu Lys Leu Leu Gly Trp Thr Ile Gly
 435 440 445

Asn Thr Thr Thr Gly Asp Ile Lys Ala Ile Leu Gly Ala Val Val Phe
 450 455 460

Leu Val Phe Tyr Ile Gly Ile Phe Ala Trp Tyr Arg Lys Gln Met Ile
 465 470 475 480

Lys Arg Asn Glu Glu Tyr Ala Ala Lys Ala Lys
 485 490

<210> 262

<211> 106

<212> PRT

<213> *Streptococcus pneumoniae*

<400> 262

Met Ile Leu Thr Leu Val Val Cys Ile Ile Leu Thr Lys Leu Phe Arg
 1 5 10 15

Leu Lys Lys Leu Gly Arg Asn Phe Ala Asp Leu Ala Phe Pro Val Leu
 20 25 30

Val Phe Glu Tyr Tyr Leu Ile Thr Ala Lys Thr Phe Thr His Asn Phe
 35 40 45

Leu Pro Arg Leu Gly Leu Ala Leu Ser Ile Leu Ala Ile Ile Leu Val
 50 55 60

Phe Phe Phe Leu Leu Lys Lys Arg Ser Phe Tyr Tyr Pro Lys Phe Ile
 65 70 75 80

Lys Phe Phe Trp Arg Ala Gly Phe Leu Leu Thr Leu Ile Met Tyr Ile
 85 90 95

Glu Met Ile Val Glu Leu Phe Leu Met Lys
 100 105

<210> 263

<211> 236

<212> PRT

<213> *Streptococcus pneumoniae*

<400> 263

Met Gly His Ile Phe Phe Phe Leu Ser Val Phe Leu Ala Gly Ile Leu
 1 5 10 15

Ser Phe Phe Ser Pro Cys Ile Leu Pro Leu Leu Pro Val Tyr Thr Gly
 20 25 30

Val Leu Leu Asp Asp Lys Asp Gly Ala Gln Ala Ser Ser Gly Lys Phe
 35 40 45

Ser Ile Ser Val Thr Ser Leu Leu Arg Thr Leu Ala Phe Ile Ala Gly
 50 55 60

Ile Ser Phe Ile Phe Ile Leu Leu Gly Tyr Gly Ala Gly Phe Leu Gly
 65 70 75 80

Asp Leu Leu Tyr Ala Ser Trp Phe Gln Tyr Leu Thr Gly Ala Ile Ile
 85 90 95

Ile Leu Leu Gly Leu His Gln Met Glu Ile Leu His Phe Lys Gly Leu
 100 105 110

Tyr Lys Glu Lys Arg Leu Gln Leu Gln Gly Gln Gly Gln Asn Gly Lys
 115 120 125

Gly Tyr Ser Gln Ala Phe Leu Leu Gly Leu Thr Phe Ser Phe Ala Trp
 130 135 140

Thr Pro Cys Val Gly Pro Val Leu Gly Ser Val Leu Ala Leu Ala Ala
 145 150 155 160

Ser Gly Gly Ser Gly Ala Trp Gln Gly Ala Gly Leu Met Leu Val Tyr
 165 170 175

Thr Leu Gly Leu Ala Leu Pro Phe Leu Leu Leu Ala Leu Thr Ser Ser
 180 185 190

Tyr Val Leu Lys His Phe Arg Lys Leu His Pro Tyr Leu Gly Ile Leu
 195 200 205

Lys Lys Val Gly Gly Phe Leu Ile Ile Val Met Gly Phe Leu Val Leu
 210 215 220

Phe Gly Asn Ala Ser Ile Leu Ser Gln Leu Phe Glu
 225 230 235

<210> 264

<211> 91

<212> PRT

<213> Streptococcus pneumoniae

<400> 264

Met Gly Met Thr Asn Leu Ser Gln Asn Arg Ala Asn Arg Asn Leu Asn
 1 5 10 15

Met Leu Asp Met His Ala Asn Cys Ser Val Ser Asp Ile Gln Ser Ser
 20 25 30

Met Ser Leu Asp Lys Phe Asn Leu Asn Trp Ile Leu His Lys Leu Lys
 35 40 45

Gly Cys Gln Leu Pro Arg Thr Ser Cys Met Lys Ser Arg Met Asp Thr
 50 55 60

Asp Asn Phe Gln Thr Lys Leu Leu Cys His Leu Thr Phe Asn Asn Glu
 65 70 75 80

Ser Pro Ile Asp Met Leu Thr Thr Leu Asn Cys
 85 90

<210> 265

<211> 332

<212> FRT

<213> Streptococcus pneumoniae

<400> 265

Met Asn Lys Arg Leu Phe Ser Lys Met Ser Leu Val Thr Leu Pro Ile
 1 5 10 15

Leu Ala Leu Phe Ser Gln Ser Val Leu Ala Glu Glu Asn Ile His Phe
 20 25 30

Ser Ser Cys Lys Glu Ala Trp Ala Asn Gly Tyr Ser Asp Ile His Glu
 35 40 45

Gly Glu Pro Gly Tyr Ser Ala Lys Leu Asp Arg Asp His Asp Gly Val
 50 55 60

Ala Cys Glu Leu Lys Asn Ala Pro Lys Gly Ala Phe Lys Ala Lys Gln
 65 70 75 80

Ser Thr Ala Ile Gln Ile Asn Thr Ser Ser Ala Thr Thr Ser Gly Trp
 85 90 95

Val Lys Gln Asp Gly Ala Trp Tyr Tyr Phe Asp Gly Asn Gly Asn Leu
 100 105 110

Val Lys Asn Ala Trp Gln Gly Ser Tyr Tyr Leu Lys Ala Asp Gly Lys
 115 120 125

Met Ala Gln Ser Glu Trp Ile Tyr Asp Ser Ser Tyr Gln Ala Trp Tyr
 130 135 140

Tyr Leu Lys Ser Asp Gly Ser Tyr Ala Lys Asn Ala Trp Gln Gly Ala
 145 150 155 160

Tyr Tyr Leu Lys Ser Asn Gly Lys Met Ala Gln Gly Glu Trp Val Tyr
 165 170 175

Asp Ser Ser Tyr Gln Ala Trp Tyr Tyr Leu Lys Ser Asp Gly Ser Tyr
 180 185 190

Ala Arg Asn Ala Trp Gln Gly Asn Tyr Tyr Leu Lys Ser Asp Gly Lys
 195 200 205

Met Ala Lys Gly Glu Trp Val Tyr Asp Ala Thr Tyr Gln Ala Trp Tyr
 210 215 220

Tyr Leu Thr Ser Asp Gly Ser Tyr Ala Tyr Ser Thr Trp Gln Gly Asn
 225 230 235 240

Tyr Tyr Leu Lys Ser Asp Gly Lys Met Ala Val Asn Glu Trp Val Asp
 245 250 255

Gly Gly Arg Tyr Tyr Val Gly Ala Asp Gly Val Trp Lys Glu Val Gln
 260 265 270

Ala Ser Thr Ala Ser Ser Ser Asn Asp Ser Asn Ser Glu Tyr Ser Ala
 275 280 285

Ala Leu Gly Lys Ala Lys Ser Tyr Asn Ser Leu Phe His Met Ser Lys
 290 295 300

Lys Arg Met Tyr Arg Gln Leu Thr Ser Asp Phe Asp Lys Phe Ser Asn
 305 310 315 320

Asp Ala Ala Gln Tyr Ala Ile Asp His Leu Asp Asp
 325 330

<210> 266
 <211> 412
 <212> PRT
 <213> *Streptococcus pneumoniae*

<400> 266

Met Ile Glu Thr Glu Lys Lys Glu Glu Arg Val Leu Leu Ile Gly Val
 1 5 10 15

Glu Leu Gln Gly Met Asp Ser Phe Asp Leu Ser Met Glu Glu Leu Ala
 20 25 30

Ser Leu Ala Lys Thr Ala Gly Ala Val Val Val Asp Ser Tyr Arg Gln
 35 40 45

Lys Arg Glu Lys Tyr Asp Ser Lys Thr Phe Val Gly Ser Gly Lys Leu
 50 55 60

Glu Glu Ile Ala Leu Met Val Asp Ala Glu Glu Ile Thr Thr Val Ile
 65 70 75 80

Val Asn Asn Arg Leu Thr Pro Arg Gln Asn Val Asn Leu Glu Glu Val
 85 90 95

Leu Gly Val Lys Val Ile Asp Arg Met Gln Leu Ile Leu Asp Ile Phe
 100 105 110

Ala Met Arg Ala Arg Ser His Glu Gly Lys Leu Gln Val His Leu Ala
 115 120 125

Gln Leu Lys Tyr Leu Leu Pro Arg Leu Val Gly Gln Gly Ile Met Leu
 130 135 140

Ser Arg Gln Ala Gly Gly Ile Gly Ser Arg Gly Pro Gly Glu Ser Gln
 145 150 155 160

Leu Glu Leu Asn Arg Arg Ser Val Arg Asn Gln Ile Thr Asp Ile Glu
 165 170 175

Arg Gln Leu Lys Val Val Glu Lys Asn Arg Ala Thr Val Arg Glu Lys
 180 185 190

Arg Leu Glu Ser Ser Thr Phe Lys Ile Gly Leu Ile Gly Tyr Thr Asn
 195 200 205
 Ala Gly Lys Ser Thr Ile Met Asn Ile Leu Thr Ser Lys Thr Gln Tyr
 210 215 220
 Glu Ala Asp Glu Leu Phe Ala Thr Leu Asp Ala Thr Thr Lys Ser Ile
 225 230 235 240
 His Leu Gly Gly Asn Leu Gln Val Thr Leu Thr Asp Thr Val Gly Phe
 245 250 255
 Ile Gln Asp Leu Pro Thr Glu Leu Val Ser Ser Phe Lys Ser Thr Leu
 260 265 270
 Glu Glu Ser Lys His Val Asp Leu Leu Val His Val Ile Asp Ala Ser
 275 280 285
 Asn Pro Tyr His Glu Glu His Glu Lys Thr Val Leu Ser Ile Met Lys
 290 295 300
 Asp Leu Asp Met Glu Asp Ile Pro His Leu Thr Leu Tyr Asn Lys Ala
 305 310 315 320
 Asp Leu Val Glu Asp Phe Thr Pro Thr Gln Thr Pro Tyr Thr Leu Ile
 325 330 335
 Ser Ala Lys Ser Glu Asp Ser Arg Glu Asn Leu Gln Ala Leu Leu Leu
 340 345 350
 Asp Lys Ile Lys Glu Ile Phe Glu Ala Phe Thr Leu Arg Val Pro Phe
 355 360 365
 Ser Lys Ser Tyr Lys Ile His Asp Leu Glu Ser Val Ala Ile Leu Glu
 370 375 380
 Glu Arg Asp Tyr Gln Glu Asp Gly Glu Val Ile Thr Gly Tyr Ile Ser
 385 390 395 400
 Glu Lys Asn Lys Trp Arg Leu Glu Glu Phe Tyr Asp
 405 410

<210> 267
 <211> 84
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 267

Met Val Tyr Leu Val Leu Gly Ile Leu Leu Leu Leu Tyr Val Phe
 1 5 10 15

Ala Thr Pro Glu Ser Ile Lys Gly Thr Val Asn Ile Val Ala Met Val
 20 25 30

Cys Ile Leu Val Ala Leu Leu Ile Leu Leu Val Leu Ser Phe Leu Lys
 35 40 45

Ile Phe Gln Leu Pro Thr Glu Ile Phe Leu Ala Ile Ala Met Leu Ile
 50 55 60

Leu Ala Tyr Phe Ser Val Arg Asp Ile Thr Leu Met Pro Val Lys Lys
 65 70 75 80

Ser Lys Arg Arg

<210> 268
 <211> 211
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 268

Met Tyr Gly Val Arg Lys Leu Ile Val Ala Asp Tyr Asp Ile Ile Glu
 1 5 10 15

Pro Ser Asn Leu Asn Arg Gln Ile Leu Tyr Thr Glu Ser Asp Val Gly
 20 25 30

Lys Glu Lys Ile Asn Val Leu Ser Glu Lys Ile His Lys Tyr Asn Ser
 35 40 45

Asp Val Gln Val Val Pro Ile Ser Ile Lys Val Ser Ser Val Glu Glu
 50 55 60

Leu Glu Lys Ile Val Ala Glu Tyr Gly Ser Ile Asp Phe Ile Val Lys
65 70 75 80

Ala Ile Asp Thr Pro Ile Asp Ile Ile Lys Ile Val Asn Gln Phe Ala
85 90 95

Val Ser His Lys Ile Ser Tyr Ile Ser Gly Gly Phe Asn Gly Cys Tyr
100 105 110

Leu Ile Ile Asp Asn Ile Tyr Ile Pro Thr Ile Gly Ser Cys Phe Gly
115 120 125

Cys Arg Asn Ile Asn Lys Asp Ile Asn Lys Tyr Thr Leu Ser Asp Lys
130 135 140

Thr Lys Trp Pro Thr Thr Pro Glu Met Pro Ala Ile Leu Gly Gly Ile
145 150 155 160

Met Thr Asn Leu Ile Ile Lys Ile Phe Leu Gly Cys Tyr Asn Glu Ile
165 170 175

Leu Ile Asp Asn Ala Tyr Val Tyr Asn Met Arg Asn His Ala Leu Ser
180 185 190

Gln Glu Lys Tyr Val Leu Glu Asn Gly Glu Cys Pro Ile Cys Lys Lys
195 200 205

Ile Ile Lys
210

<210> 269

<211> 126

<212> PRT

<213> Streptococcus pneumoniae

<400> 269

Met Lys Asp Asn Asn Ile Arg Ala Lys Thr Phe Ile Arg Ser Val Cys
1 5 10 15

Phe Cys Leu Leu Ser Gly Gly Val Ala Phe Leu Ser Ala Ile Gly Gln
20 25 30

Phe Thr Val Ile Glu Thr Gln Leu Ile Val Leu Phe Leu Gly Ile Ile
 35 40 45

Phe Ala Ile Tyr Tyr Ala Tyr Tyr Asn Lys Asn Ile Gln Thr Ser Leu
 50 55 60

Glu Asn Ile Val Trp Leu Phe Ser Ser Phe Glu Ile Leu Phe Leu Leu
 65 70 75 80

Val Asn Phe Arg Thr Phe Ile Gln Leu Pro Val Asp Ile Phe Ile Gly
 85 90 95

Met Ile Ile Phe Leu Met Leu Trp Ile Phe Ile Met Leu Gly Ile Val
 100 105 110

Cys Leu Ser Tyr Tyr Ile Thr Leu Leu Phe Ser Lys Glu Ala
 115 120 125

<210> 270

<211> 217

<212> PRT

<213> Streptococcus pneumoniae

<400> 270

Met Gly Gln Lys Ser Gln Asn Leu Thr Ser Gly Glu Leu Lys Arg Ile
 1 5 10 15

Gly Leu Val Ser Asp Thr Ser Gly Phe Tyr Glu Lys Met Ser Leu Tyr
 20 25 30

Asn Asn Leu Leu Phe Tyr Ser Lys Phe Tyr Asn Ile Ser Lys Ser Arg
 35 40 45

Val Asp Asn Leu Leu Lys Arg Val Gly Leu Tyr Asp Ser Arg Lys Met
 50 55 60

Val Ala Gly Lys Leu Ser Thr Gly Met Arg Gln Arg Met Leu Leu Ala
 65 70 75 80

Arg Ala Leu Ile Asn Asn Pro Ala Val Leu Phe Leu Asp Glu Pro Thr
 85 90 95

Ser Gly Leu Asp Pro Thr Thr Ser Arg Thr Ile His Glu Leu Ile Leu
 100 105 110

Glu Leu Lys Thr Ala Gly Thr Thr Ile Phe Leu Thr Thr His Asp Met
 115 120 125

Asn Glu Ala Thr Leu Leu Cys Asp Tyr Val Ala Leu Leu Asn Lys Gly
 130 135 140

Lys Leu Val Glu Gln Gly Ala Pro Ser Glu Leu Ile Gln Arg Tyr Asn
 145 150 155 160

Lys Asp Lys Lys Ile Lys Val Thr Asp Tyr Asn Gly Asn Gln Ile Thr
 165 170 175

Phe Asp Phe Thr Ser Leu Glu Gln Val Ser Gln Thr Asp Leu Glu Asn
 180 185 190

Ile Phe Ser Ile His Ser Cys Glu Pro Thr Leu Glu Asp Ile Phe Ile
 195 200 205

Thr Leu Thr Gly Gly Lys Leu Asn Ala
 210 215

<210> 271

<211> 254

<212> PRT

<213> Streptococcus pneumoniae

<400> 271

Met Glu Phe Phe Ile Cys Asn Leu Val Arg Val Val Gln Ser Pro Arg
 1 5 10 15

Phe Tyr Met Ser Leu Phe Leu Thr Leu Leu Cys Met Ser Leu Gly Asn
 20 25 30

Phe Leu Ala Phe Asn Gly Ile Tyr Lys Ile Glu Gly Leu Ser Ile Phe
 35 40 45

Phe Ala Ala Ser Ser Ile Arg Gly Phe Ser Pro Ile Ser Leu Val Ala
 50 55 60

Ala Leu Ile Cys Thr Leu Pro Tyr Ser Ser Gln Ile Ile Glu Asp Ala
65 70 75 80

Glu Ser His Phe Leu Thr Ala Gln Leu Cys Arg Ile Ser Lys Lys Lys
85 90 95

Tyr Leu Ala Ile Val Gly Ser Thr Val Ile Ile Ser Ser Phe Leu Val
100 105 110

Phe Phe Leu Pro Tyr Leu Leu Leu Leu Gly Ile Asn Leu Leu Val Thr
115 120 125

Pro Tyr Gln Glu Ile Tyr Ile Gly Asp Tyr Ser Gly Ala Leu Lys Glu
130 135 140

Leu Phe Asp Ser Asn Gln Phe Leu Tyr Ser Leu Val Thr Thr Leu Trp
145 150 155 160

Tyr Gly Val Trp Gly Ala Val Phe Ser Ile Phe Gly Leu Ala Ser Ala
165 170 175

Leu Leu Val Lys Lys Lys Ile Gly Ala Ile Phe Ile Pro Val Ala Tyr
180 185 190

Met Met Val Gly Gly Ile Phe Trp Ala Ile Leu Gly Leu Ser Tyr Leu
195 200 205

Glu Pro Val Thr Thr Leu Ala Leu Gly Tyr Gln Lys Asp Ile Ser Leu
210 215 220

Ser Leu Val Ser Ala His Leu Ala Phe Ile Leu Phe Val Ser Cys Leu
225 230 235 240

Val Val Tyr Gly Thr Phe Phe Leu His Ser Glu Asp Tyr Val
245 250

<210> 272

<211> 215

<212> PRT

<213> Streptococcus pneumoniae

<400> 272

Met Asn Glu Ile Ile Thr Leu Lys Asn Ile Glu Leu Lys Leu Lys Lys
 1 5 10 15

Thr Cys Val Phe Gln Asn Leu Asn Phe Ser Cys Lys Gln Gly Glu Ile
 20 25 30

Ile Gly Ile Thr Gly Ala Asn Gly Ser Gly Lys Ser Val Leu Phe Lys
 35 40 45

Leu Ile Ala Gly Leu Tyr Ser Pro Ser Tyr Gly Glu Val Leu Ile Asn
 50 55 60

Gly Glu Asn Ile Val Pro Glu Arg Lys Ile Pro Ala Asn Leu Gly Ala
 65 70 75 80

Leu Ile Glu Glu Pro Gly Phe Ile Asn Tyr Tyr Ser Gly Phe Lys Asn
 85 90 95

Leu Gln Tyr Leu Ala Ser Ile Arg Gly Val Val Gly Asn Gln Glu Ile
 100 105 110

Asn Asp Thr Leu Lys Ile Val Gly Leu Tyr Glu Gln Lys Asp Gln Lys
 115 120 125

Val Lys Thr Tyr Ser Leu Gly Met Arg Lys Lys Leu Gly Ile Ala Gln
 130 135 140

Ala Ile Met Glu Asn Pro Ser Ile Leu Leu Leu Asp Glu Pro Met Asn
 145 150 155 160

Ala Leu Asp Lys Ser Ser Val Glu Asn Met Arg Thr Leu Phe Arg Lys
 165 170 175

Leu Ser Ser Glu Lys Gly Thr Thr Ile Leu Ile Ala Ser His Ser Glu
 180 185 190

Glu Asp Ile Arg Ile Leu Cys Asp Lys Val Tyr Ala Ile Glu Asp Lys
 195 200 205

Val Cys Thr Leu Cys Ser Asp
 210 215

<210> 273
 <211> 252
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 273

Met Ser Glu Thr Ile Leu Glu Ile Lys Glu Leu Lys Lys Ser Phe Gly
 1 5 10 15

Asp Asn Pro Ile Leu Gln Gly Leu Ser Leu Glu Ile Lys Lys Gly Glu
 20 25 30

Val Val Val Ile Leu Gly Pro Ser Gly Cys Gly Lys Ser Thr Leu Leu
 35 40 45

Arg Cys Leu Asn Gly Leu Glu Ser Ile Gln Gly Gly Asp Ile Leu Leu
 50 55 60

Asp Gly Gln Ser Ile Val Glu Asn Lys Lys Asp Phe His Leu Val Arg
 65 70 75 80

Gln Lys Ile Gly Met Val Phe Gln Ser Tyr Glu Leu Phe Pro His Leu
 85 90 95

Asp Val Leu Gln Asn Leu Ile Leu Gly Pro Ile Lys Ala Gln Gly Arg
 100 105 110

Asp Lys Lys Glu Val Thr Glu Glu Ala Leu Gln Leu Leu Glu Arg Val
 115 120 125

Gly Leu Leu Asp Lys Gln His Ser Phe Ala Arg Gln Leu Ser Gly Gly
 130 135 140

Gln Lys Gln Arg Val Ala Ile Val Arg Ala Leu Leu Met His Pro Glu
 145 150 155 160

Ile Ile Leu Phe Asp Glu Val Thr Ala Ser Leu Asp Pro Glu Met Val
 165 170 175

Arg Glu Val Leu Glu Leu Ile Asn Asp Leu Ala Gln Glu Gly Arg Thr
 180 185 190

Met Ile Leu Val Thr His Glu Met Gln Phe Ala Gln Ala Ile Thr Asp
 195 200 205

Arg Ile Ile Phe Leu Asp Gln Gly Lys Ile Ala Glu Glu Gly Thr Ala
 210 215 220

Gln Ala Phe Phe Thr Asn Pro Gln Thr Lys Arg Ala Gln Glu Phe Leu
 225 230 235 240

Asn Val Phe Asp Phe Ser Gln Phe Gly Ser Tyr Leu
 245 250

<210> 274

<211> 206

<212> PRT

<213> Streptococcus pneumoniae

<400> 274

Met His Ile Ala Val Trp Gly Ile Leu Gly Ser Phe Leu Leu Gly Leu
 1 5 10 15

Ile Val Ser Ile Ile Arg His Tyr Arg Ile Leu Val Leu Ala Gln Val
 20 25 30

Ala Thr Ala Tyr Ile Glu Leu Ser Arg Asn Thr Pro Leu Leu Ile Gln
 35 40 45

Leu Phe Phe Leu Tyr Phe Gly Leu Pro Arg Ile Gly Ile Val Leu Ser
 50 55 60

Ser Glu Val Cys Ala Thr Leu Gly Leu Val Phe Leu Gly Gly Ser Tyr
 65 70 75 80

Met Ala Glu Ser Phe Arg Ser Gly Leu Glu Ala Ile Ser Gln Thr Gln
 85 90 95

Gln Glu Ile Gly Leu Ala Ile Gly Leu Thr Pro Leu Gln Val Phe Tyr
 100 105 110

Tyr Val Val Leu Pro Gln Ala Thr Ala Val Ala Leu Pro Ser Phe Ser
 115 120 125

Ala Asn Val Ile Phe Leu Ile Lys Glu Thr Ser Val Phe Ser Ala Val
 130 135 140

Ala Leu Ala Asp Leu Met Tyr Val Ala Lys Asp Leu Ile Gly Leu Tyr
 145 150 155 160

Tyr Glu Thr Asp Ile Ala Leu Ala Met Leu Val Val Ala Tyr Leu Ile
 165 170 175

Met Leu Leu Pro Ile Ser Leu Val Phe Ser Trp Ile Glu Arg Arg Leu
 180 185 190

Arg His Ala Gly Phe Gly Asn Pro Ser Thr Leu Ser Arg Lys
 195 200 205

<210> 275

<211> 461

<212> PRT

<213> Streptococcus pneumoniae

<400> 275

Met Gly Leu Glu Leu Arg Ala Ile Gln Ser Pro Ile Phe Ser Glu Pro
 1 5 10 15

Phe Asp Phe Thr Phe His Ala Gln Ala Phe Thr Leu Leu Val Gly Ser
 20 25 30

Ser Gly Ser Gly Lys Ser Ser Leu Phe Gln Met Ile Ala Gln Val Ser
 35 40 45

Ser Leu Pro Tyr Ser Gly Gln Val Leu Ile Asp Gly Ser Glu Val Ser
 50 55 60

Gln Leu Ser Ile Val Glu Arg Val Gln Thr Val Gly Ile Leu Leu Gln
 65 70 75 80

Asn Pro Asn His Gln Phe Thr Met Glu Ser Leu Phe Glu Glu Leu Val
 85 90 95

Phe Thr Met Glu Asn Ile Gly Tyr His Leu Gln Glu Ile Asp Ser Lys
 100 105 110

Ile Ala Glu Val Val Gln Gln Cys Arg Cys Lys Asp Ile Leu His Arg
 115 120 125
 Leu Ile His His Leu Ser Gly Gly Glu Lys Gln Lys Ala Ala Leu Ala
 130 135 140
 Val Leu Phe Ala Met Asn Pro Arg Val Tyr Leu Leu Asp Glu Pro Phe
 145 150 155 160
 Ala Ser Ile Asp Arg Lys Ser Arg Ile Glu Ile Leu Glu Ile Leu Lys
 165 170 175
 Glu Leu Val Tyr Asp Gly Lys Thr Val Ile Leu Cys Asp His Asp Leu
 180 185 190
 Ser Asp Tyr Lys Ala Tyr Ile Asp His Met Val Glu Leu Arg Asp Gly
 195 200 205
 Lys Leu Arg Glu Val Phe Gln Ile Pro Ser Tyr Glu Met Thr Gln Val
 210 215 220
 Ala Ser Lys Glu Val Ala Ser Ser Pro Glu Leu Phe His Met Asn Arg
 225 230 235 240
 Val Thr Gly Glu Leu Gly Asn Arg Pro Leu Phe Ser Ile Ala Asp Phe
 245 250 255
 Thr Phe Tyr Gln Gly Ile Ser Cys Ile Leu Gly Asp Asn Gly Val Gly
 260 265 270
 Lys Ser Thr Leu Phe Arg Ser Ile Leu Gln Phe Gln Lys Tyr Lys Gly
 275 280 285
 Ser Ile Thr Trp Lys Gly Ser Val Leu Lys Lys Lys Lys Ser Leu Tyr
 290 295 300
 Arg Asp Leu Thr Gly Val Val Gln Glu Ala Glu Lys Gln Phe Ile Arg
 305 310 315 320
 Val Ser Leu Arg Glu Glu Leu Gln Leu Asp Gly Pro Asp Ser Glu Arg

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325                               330                               335

Asn Gln Arg Ile Phe Gln Ala Leu Arg Tyr Phe Asp Leu Glu Gln Ala
      340                               345                               350

Val Asp Lys Ser Pro Tyr Gln Leu Ser Gly Gly Gln Gln Lys Ile Leu
      355                               360                               365

Gln Leu Leu Thr Ile Leu Thr Ser Lys Ala Ser Val Ile Leu Leu Asp
      370                               375                               380

Glu Pro Phe Ala Gly Leu Asp Asp Arg Ala Cys His Tyr Phe Cys Lys
      385                               390                               395                               400

Trp Ile Val Glu Glu Arg Asn Gln Gly Arg Ser Phe Leu Leu Ile Ser
      405                               410                               415

His Arg Leu Asp Pro Leu Ile Ser Val Val Asp Tyr Trp Ile Glu Met
      420                               425                               430

Thr Ser Gln Gly Leu Arg His Val Lys Glu Val Thr Ile Thr Lys Pro
      435                               440                               445

Leu Thr Ser Gln Ser Ser Asn Thr Gln Gly Glu Val Arg
      450                               455                               460

<210> 276
<211> 397
<212> PRT
<213> Streptococcus pneumoniae

<400> 276

Met Trp Tyr Asn Arg Ala Met Lys His Phe Asp Thr Ile Val Ile Gly
1      5      10      15

Gly Gly Pro Ala Gly Met Met Ala Thr Ile Ser Ser Ser Phe Tyr Gly
      20      25      30

Gln Lys Thr Leu Leu Ile Glu Lys Asn Arg Lys Leu Gly Lys Lys Leu
      35      40      45

Ala Gly Thr Gly Gly Gly Arg Cys Asn Val Thr Asn Asn Gly Ser Leu

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50	55	60
Asp Asn Leu Leu Ala Gly Ile Pro Gly Asn Gly Arg Phe Leu Tyr Ser 65 70 75 80		
Val Phe Ser Gln Phe Asp Asn His Asp Ile Ile Asn Phe Phe Thr Glu 85 90 95		
Asn Gly Val Lys Leu Lys Val Glu Asp His Gly Arg Val Phe Pro Ala 100 105 110		
Ser Asp Lys Ser Arg Thr Ile Ile Glu Ala Leu Glu Lys Lys Ile Thr 115 120 125		
Glu Leu Gly Gly Gln Val Ala Thr Gln Ile Glu Ile Val Ser Val Lys 130 135 140		
Lys Val Asp Asp Gln Phe Val Leu Lys Ser Ala Asp Gln Thr Phe Thr 145 150 155 160		
Cys Glu Lys Leu Ile Val Thr Thr Gly Gly Lys Ser Tyr Pro Ser Thr 165 170 175		
Gly Ser Thr Gly Phe Gly His Glu Ile Ala Arg His Phe Lys His Thr 180 185 190		
Ile Thr Asp Leu Glu Ala Ala Glu Ser Pro Leu Leu Thr Asp Phe Pro 195 200 205		
His Lys Ala Leu Gln Gly Ile Ser Leu Asp Asp Val Thr Leu Ser Tyr 210 215 220		
Gly Lys His Val Ile Thr His Asp Leu Leu Phe Thr His Phe Gly Leu 225 230 235 240		
Ser Gly Pro Ala Ala Leu Arg Met Ser Ser Phe Val Lys Gly Gly Glu 245 250 255		
Val Leu Ser Leu Asp Val Leu Pro Gln Leu Ser Glu Lys Asp Leu Val 260 265 270		

Thr Phe Leu Glu Glu Asn Arg Glu Lys Ser Leu Lys Asn Ala Leu Lys
 275 280 285

Thr Leu Leu Pro Glu Arg Leu Ala Glu Phe Phe Val Gln Gly Tyr Pro
 290 295 300

Glu Lys Val Lys Gln Leu Thr Glu Lys Glu Arg Glu Gln Leu Val Gln
 305 310 315 320

Ser Ile Lys Glu Leu Lys Ile Pro Val Thr Gly Lys Met Ser Leu Ala
 325 330 335

Lys Ser Phe Val Thr Lys Gly Gly Val Ser Leu Lys Glu Ile Asn Pro
 340 345 350

Lys Thr Leu Glu Ser Lys Leu Val Pro Gly Leu His Phe Ala Gly Glu
 355 360 365

Val Met Asp Ile Asn Ala His Thr Gly Gly Phe Asn Ile Thr Ser Ala
 370 375 380

Leu Cys Thr Gly Trp Val Ala Gly Ser Leu His Tyr Asp
 385 390 395

<210> 277

<211> 83

<212> PRT

<213> Streptococcus pneumoniae

<400> 277

Met Lys Lys Lys Phe Ala Leu Ser Phe Val Ala Leu Ala Ser Val Ala
 1 5 10 15

Leu Leu Ala Ala Cys Gly Glu Val Lys Ser Gly Ala Val Asn Thr Ala
 20 25 30

Gly Asn Ser Val Glu Glu Lys Thr Ile Lys Ile Gly Phe Asn Phe Glu
 35 40 45

Glu Ser Gly Ser Leu Ala Ala Tyr Gly Thr Ala Glu Gln Lys Gly Ala
 50 55 60

Gln Leu Ala Val Asp Glu Ile Asn Ala Ala Val Val Ser Met Glu Asn
 65 70 75 80

Lys Ser Lys

<210> 278
 <211> 254
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 278

Met Ala Leu Leu Glu Val Lys Gln Leu Thr Lys His Phe Gly Gly Leu
 1 5 10 15

Thr Ala Val Gly Asp Val Thr Leu Glu Leu Asn Glu Gly Glu Leu Val
 20 25 30

Gly Leu Ile Gly Pro Asn Gly Ala Gly Lys Thr Thr Leu Phe Asn Leu
 35 40 45

Leu Thr Gly Val Tyr Glu Pro Ser Glu Gly Thr Val Thr Leu Asp Gly
 50 55 60

His Leu Leu Asn Gly Lys Ser Pro Tyr Lys Ile Ala Ser Leu Gly Leu
 65 70 75 80

Gly Arg Thr Phe Gln Asn Ile Arg Leu Phe Lys Asp Leu Thr Val Leu
 85 90 95

Asp Asn Val Leu Ile Ala Phe Gly Asn His His Lys Gln His Val Phe
 100 105 110

Thr Ser Phe Leu Arg Leu Pro Ala Phe Tyr Lys Ser Glu Lys Glu Leu
 115 120 125

Lys Ala Lys Ala Leu Glu Leu Leu Lys Ile Phe Asp Leu Asp Gly Asp
 130 135 140

Ala Glu Thr Leu Ala Lys Asn Leu Ser Tyr Gly Gln Gln Arg Arg Leu
 145 150 155 160

Glu Ile Val Arg Ala Leu Ala Thr Glu Pro Lys Ile Leu Phe Leu Asp
 165 170 175

Glu Pro Ala Ala Gly Met Asn Pro Gln Glu Thr Ala Glu Leu Thr Glu
 180 185 190

Leu Ile Arg Arg Ile Lys Asp Glu Phe Lys Ile Thr Ile Met Leu Ile
 195 200 205

Glu His Asp Met Asn Leu Val Met Glu Val Thr Glu Arg Ile Tyr Val
 210 215 220

Leu Glu Tyr Gly Arg Leu Ile Ala Gln Gly Thr Pro Asp Glu Ile Lys
 225 230 235 240

Thr Asn Lys Arg Val Ile Glu Ala Tyr Leu Gly Gly Glu Ala
 245 250

<210> 279

<211> 230

<212> PRT

<213> Streptococcus pneumoniae

<400> 279

Met Ser Ile Ile Glu Met Arg Asp Val Val Lys Lys Tyr Asp Asn Gly
 1 5 10 15

Thr Thr Ala Leu Arg Gly Val Ser Val Ser Val Gln Pro Gly Glu Phe
 20 25 30

Ala Tyr Ile Val Gly Pro Ser Gly Ala Gly Lys Ser Thr Phe Ile Arg
 35 40 45

Ser Leu Tyr Arg Glu Val Lys Ile Asp Lys Gly Ser Leu Ser Val Ala
 50 55 60

Gly Phe Asn Leu Val Lys Ile Lys Lys Lys Asp Val Pro Leu Leu Arg
 65 70 75 80

Arg Ser Val Gly Val Val Phe Gln Asp Tyr Lys Leu Leu Pro Lys Lys
 85 90 95

Thr Val Tyr Glu Asn Ile Ala Tyr Ala Met Glu Val Ile Gly Glu Asn
 100 105 110

Arg Arg Asn Ile Lys Arg Arg Val Met Glu Val Leu Asp Leu Val Gly
 115 120 125

Leu Lys His Lys Val Arg Ser Phe Pro Asn Glu Leu Ser Gly Gly Glu
 130 135 140

Gln Gln Arg Ile Ala Ile Ala Arg Ala Ile Val Asn Asn Pro Lys Val
 145 150 155 160

Leu Ile Ala Asp Glu Pro Thr Gly Asn Leu Asp Pro Asp Asn Ser Trp
 165 170 175

Glu Ile Met Asn Leu Leu Glu Arg Ile Asn Leu Gln Gly Thr Thr Ile
 180 185 190

Leu Met Ala Thr His Asn Ser Gln Ile Val Asn Thr Leu Arg His Arg
 195 200 205

Val Ile Ala Ile Glu Asn Gly Arg Val Val Arg Asp Glu Ser Lys Gly
 210 215 220

Glu Tyr Gly Tyr Asp Asp
 225 230

<210> 280

<211> 726

<212> PRT

<213> Streptococcus pneumoniae

<400> 280

Met Met Lys Asp Thr Phe Lys Asn Val Leu Ser Phe Glu Phe Trp Gln
 1 5 10 15

Lys Phe Gly Lys Ala Leu Met Val Val Ile Ala Val Met Pro Ala Ala
 20 25 30

Gly Leu Met Ile Ser Ile Gly Lys Ser Ile Val Met Ile Asn Pro Thr
 35 40 45

Phe Ala Pro Leu Val Ile Thr Gly Gly Ile Leu Glu Gln Ile Gly Trp
 50 55 60

Gly Val Ile Gly Asn Leu His Ile Leu Phe Ala Leu Ala Ile Gly Gly
 65 70 75 80

Ser Trp Ala Lys Glu Arg Ala Gly Gly Ala Phe Ala Ala Gly Leu Ala
 85 90 95

Phe Ile Leu Ile Asn Arg Ile Thr Gly Thr Ile Phe Gly Val Ser Gly
 100 105 110

Asp Met Leu Lys Asn Pro Asp Ala Met Val Thr Thr Phe Phe Gly Gly
 115 120 125

Ser Ile Lys Val Ala Asp Tyr Phe Ile Ser Val Leu Glu Ala Pro Ala
 130 135 140

Leu Asn Met Gly Val Phe Val Gly Ile Ile Ser Gly Phe Val Gly Ala
 145 150 155 160

Thr Ala Tyr Asn Lys Tyr Tyr Asn Phe Arg Lys Leu Pro Asp Ala Leu
 165 170 175

Ser Phe Phe Asn Gly Lys Arg Phe Val Pro Phe Val Val Ile Leu Arg
 180 185 190

Ser Ala Ile Ala Ala Ile Leu Leu Ala Ala Phe Trp Pro Val Val Gln
 195 200 205

Thr Gly Ile Asn Asn Phe Gly Ile Trp Ile Ala Asn Ser Gln Glu Thr
 210 215 220

Ala Pro Ile Leu Ala Pro Phe Leu Tyr Gly Thr Leu Glu Arg Leu Leu
 225 230 235 240

Leu Pro Phe Gly Leu His His Met Leu Thr Ile Pro Met Asn Tyr Thr
 245 250 255

Ala Leu Gly Gly Thr Tyr Asp Ile Leu Thr Gly Ala Ala Lys Gly Thr
 260 265 270

Gln Val Phe Gly Gln Asp Pro Leu Trp Leu Ala Trp Val Thr Asp Leu
 275 280 285

Val Asn Leu Lys Gly Thr Asp Ala Ser Gln Tyr Gln His Leu Leu Asp
 290 295 300

Thr Val His Pro Ala Arg Phe Lys Val Gly Gln Met Ile Gly Ser Phe
 305 310 315 320

Gly Ile Leu Met Gly Val Ile Val Ala Ile Tyr Arg Asn Val Asp Ala
 325 330 335

Asp Lys Lys His Lys Tyr Lys Gly Met Met Ile Ala Thr Ala Leu Ala
 340 345 350

Thr Phe Leu Thr Gly Val Thr Glu Pro Ile Glu Tyr Met Phe Met Phe
 355 360 365

Ile Ala Thr Pro Met Tyr Leu Val Tyr Ser Leu Val Gln Gly Ala Ala
 370 375 380

Phe Ala Met Ala Asp Val Val Asn Leu Arg Met His Ser Phe Gly Ser
 385 390 395 400

Ile Glu Phe Leu Thr Arg Thr Pro Ile Ala Ile Ser Ala Gly Ile Gly
 405 410 415

Met Asp Ile Val Asn Phe Val Trp Val Thr Val Leu Phe Ala Val Ile
 420 425 430

Met Tyr Phe Ile Ala Asn Phe Met Ile Gln Lys Phe Asn Tyr Ala Thr
 435 440 445

Pro Gly Arg Asn Gly Asn Tyr Glu Thr Ala Glu Gly Ser Glu Glu Thr
 450 455 460

Ser Ser Glu Val Lys Val Ala Ala Gly Ser Gln Ala Val Asn Ile Ile
 465 470 475 480

Asn Leu Leu Gly Gly Arg Val Asn Ile Val Asp Val Asp Ala Cys Met
 485 490 495

Thr Arg Leu Arg Val Thr Val Lys Asp Ala Asp Lys Val Gly Asn Ala
 500 505 510

Glu Gln Trp Lys Ala Glu Gly Ala Met Gly Leu Val Met Lys Gly Gln
 515 520 525

Gly Val Gln Ala Ile Tyr Gly Pro Lys Ala Asp Ile Leu Lys Ser Asp
 530 535 540

Ile Gln Asp Ile Leu Asp Ser Gly Glu Ile Ile Pro Glu Thr Leu Pro
 545 550 555 560

Ser Gln Met Thr Glu Ala Gln Gln Asn Thr Val His Phe Lys Asp Leu
 565 570 575

Thr Glu Glu Val Tyr Ser Val Ala Asp Gly Gln Val Val Ala Leu Glu
 580 585 590

Gln Val Lys Asp Pro Val Phe Ala Gln Lys Met Met Gly Asp Gly Phe
 595 600 605

Ala Val Glu Pro Ala Asn Gly Asn Ile Val Ser Pro Val Ser Gly Thr
 610 615 620

Val Ser Ser Ile Phe Pro Thr Lys His Ala Phe Gly Ile Val Thr Glu
 625 630 635 640

Ala Gly Leu Glu Val Leu Val His Ile Gly Leu Asp Thr Val Ser Leu
 645 650 655

Glu Gly Lys Pro Phe Thr Val His Val Ala Glu Gly Gln Lys Val Ala
 660 665 670

Ala Gly Asp Leu Leu Val Thr Ala Asp Leu Asp Ala Ile Arg Ala Ala
 675 680 685

Gly Arg Glu Thr Ser Thr Val Val Val Phe Thr Asn Gly Asp Ala Ile
 690 695 700

Lys Ser Val Lys Leu Glu Lys Thr Gly Ser Leu Ala Ala Lys Thr Ala

705 710 715 720

Val Ala Lys Val Glu Leu
725

<210> 281
<211> 513
<212> PRT
<213> Streptococcus pneumoniae

<400> 281

Met Ser Ile Leu Glu Val Lys Asn Leu Ser His Gly Phe Gly Asp Arg
1 5 10 15
Ala Ile Phe Glu Asp Val Ser Phe Arg Leu Leu Lys Gly Glu His Ile
20 25 30
Gly Leu Val Gly Ala Asn Gly Glu Gly Lys Ser Thr Phe Met Ser Ile
35 40 45
Val Thr Gly Lys Met Leu Pro Asp Glu Gly Lys Val Glu Trp Ser Lys
50 55 60
Tyr Val Thr Ala Gly Tyr Leu Asp Gln His Ser Val Leu Ala Glu Arg
65 70 75 80
Gln Ser Val Arg Asp Val Leu Arg Thr Ala Phe Asp Glu Leu Phe Lys
85 90 95
Ala Glu Ala Arg Ile Asn Asp Leu Tyr Met Lys Met Ala Glu Asp Gly
100 105 110
Ala Asp Val Asp Ala Leu Met Glu Glu Val Gly Glu Leu Gln Asp Arg
115 120 125
Leu Glu Ser Arg Asp Phe Tyr Thr Leu Asp Ala Lys Ile Asp Glu Val
130 135 140
Ala Arg Ala Leu Gly Val Met Asp Phe Gly Met Asp Thr Asp Val Thr
145 150 155 160
Ser Leu Ser Ser Gly Gly Gln Arg Thr Lys Val Leu Leu Ala Lys Leu Leu

165	170	175
Leu Glu Lys Pro Asp Ile Leu Leu Leu Asp Glu Pro Thr Asn Tyr Leu		
180	185	190
Asp Ala Glu His Ile Asp Trp Leu Lys Arg Tyr Leu Gln Asn Tyr Glu		
195	200	205
Asn Ala Phe Val Leu Ile Ser His Asp Ile Pro Phe Leu Asn Asp Val		
210	215	220
Ile Asn Ile Val Tyr His Val Glu Asn Gln Gln Leu Thr Arg Tyr Ser		
225	230	235
Gly Asp Tyr Tyr Gln Phe Gln Glu Val Tyr Ala Met Lys Lys Ser Gln		
245	250	255
Leu Glu Ala Ala Tyr Glu Arg Gln Gln Lys Glu Ile Ala Asp Leu Lys		
260	265	270
Asp Phe Val Ala Arg Asn Lys Ala Arg Val Ala Thr Arg Asn Met Ala		
275	280	285
Met Ser Arg Gln Lys Lys Leu Asp Lys Met Asp Ile Ile Glu Leu Gln		
290	295	300
Ser Glu Lys Pro Lys Pro Ser Phe Asp Phe Lys Pro Ala Arg Thr Pro		
305	310	315
Gly Arg Phe Ile Phe Gln Ala Lys Asn Leu Gln Ile Gly Tyr Asp Arg		
325	330	335
Pro Leu Thr Lys Pro Leu Asn Leu Thr Phe Glu Arg Asn Gln Lys Val		
340	345	350
Ala Ile Ile Gly Ala Asn Gly Ile Gly Lys Thr Thr Leu Leu Lys Ser		
355	360	365
Leu Leu Gly Ile Ile Ser Pro Ile Ala Gly Glu Val Glu Arg Gly Asp		
370	375	380

Tyr Leu Glu Leu Gly Tyr Phe Glu Gln Glu Val Glu Gly Gly Asn Arg
 385 390 395 400

Gln Thr Pro Leu Glu Ala Val Trp Asn Ala Phe Pro Ala Leu Asn Gln
 405 410 415

Ala Glu Val Arg Ala Ala Leu Ala Arg Cys Gly Leu Thr Thr Lys His
 420 425 430

Ile Glu Ser Gln Ile Gln Val Leu Ser Gly Gly Glu Gln Ala Lys Val
 435 440 445

Arg Phe Cys Leu Leu Met Asn Arg Glu Asn Asn Val Leu Val Leu Asp
 450 455 460

Glu Pro Thr Asn His Leu Asp Val Asp Ala Lys Asp Glu Leu Lys Arg
 465 470 475 480

Ala Leu Lys Glu Tyr Arg Gly Ser Ile Leu Met Val Cys His Glu Pro
 485 490 495

Asp Phe Tyr Glu Gly Trp Ile Asp Gln Ile Trp Asp Phe Asn Asn Leu
 500 505 510

Thr

<210> 282
 <211> 267
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 282

Met Lys Lys Leu Ala Thr Leu Leu Leu Leu Ser Thr Val Ala Leu Ala
 1 5 10 15

Gly Cys Ser Ser Val Gln Arg Ser Leu Arg Gly Asp Asp Tyr Val Asp
 20 25 30

Ser Ser Leu Ala Ala Glu Glu Ser Ser Lys Val Ala Ala Gln Ser Ala
 35 40 45

Lys Glu Leu Asn Asp Ala Leu Thr Asn Glu Asn Ala Asn Phe Pro Gln
 50 55 60

Leu Ser Lys Glu Val Ala Glu Asp Glu Ala Glu Val Ile Phe His Thr
 65 70 75 80

Ser Gln Gly Asp Ile Arg Ile Lys Leu Phe Pro Lys Leu Ala Pro Leu
 85 90 95

Ala Val Glu Asn Phe Leu Thr His Ala Lys Glu Gly Tyr Tyr Asn Gly
 100 105 110

Ile Thr Phe His Arg Val Ile Asp Gly Phe Met Val Gln Thr Gly Asp
 115 120 125

Pro Lys Gly Asp Gly Thr Gly Gly Gln Ser Ile Trp His Asp Lys Asp
 130 135 140

Lys Thr Lys Asp Lys Gly Thr Gly Phe Lys Asn Glu Ile Thr Pro Tyr
 145 150 155 160

Leu Tyr Asn Ile Arg Gly Ala Leu Ala Met Ala Asn Thr Gly Gln Pro
 165 170 175

Asn Thr Asn Gly Ser Gln Phe Phe Ile Asn Gln Asn Ser Thr Asp Thr
 180 185 190

Ser Ser Lys Leu Pro Thr Ser Lys Tyr Pro Gln Lys Ile Ile Glu Ala
 195 200 205

Tyr Lys Glu Gly Gly Asn Pro Ser Leu Asp Gly Lys His Pro Val Phe
 210 215 220

Gly Gln Val Ile Asp Gly Met Asp Val Val Asp Lys Ile Ala Lys Ala
 225 230 235 240

Glu Lys Asp Glu Lys Asp Lys Pro Thr Thr Ala Ile Thr Ile Asp Ser
 245 250 255

Ile Glu Val Val Lys Asp Tyr Asp Phe Lys Ser
 260 265

<210> 283
 <211> 448
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 283

Met Arg Glu Tyr Asp Ile Ile Ala Ile Gly Gly Gly Ser Gly Gly Ile
 1 5 10 15

Ala Thr Met Asn Arg Ala Gly Glu His Gly Ala Lys Ala Ala Val Ile
 20 25 30

Glu Glu Lys Lys Leu Gly Gly Thr Cys Val Asn Val Gly Cys Val Pro
 35 40 45

Lys Lys Ile Met Trp Tyr Gly Ala Gln Ile Ala Glu Thr Phe His Gln
 50 55 60

Phe Gly Glu Asp Tyr Gly Phe Lys Thr Thr Asp Leu Asn Phe Asp Phe
 65 70 75 80

Ala Thr Leu Arg Arg Asn Arg Glu Ala Tyr Ile Asp Arg Ala Arg Ser
 85 90 95

Ser Tyr Asp Gly Ser Phe Lys Arg Asn Gly Val Asp Leu Ile Glu Gly
 100 105 110

His Ala Glu Phe Val Asp Ser His Thr Val Ser Val Asn Gly Glu Leu
 115 120 125

Ile Arg Ala Lys His Ile Val Ile Ala Thr Gly Ala His Pro Ser Ile
 130 135 140

Pro Asn Ile Pro Gly Ala Glu Leu Gly Gly Ser Ser Asp Asp Val Phe
 145 150 155 160

Ala Trp Glu Glu Leu Pro Glu Ser Ile Ala Ile Leu Gly Ala Gly Tyr
 165 170 175

Ile Ala Val Glu Leu Ala Gly Val Leu His Thr Phe Gly Val Lys Thr
 180 185 190

Asp Leu Phe Val Arg Arg Asp Arg Pro Leu Arg Gly Phe Asp Ser Tyr
 195 200 205
 Ile Val Glu Gly Leu Val Lys Glu Met Glu Arg Thr Asn Leu Pro Leu
 210 215 220
 His Thr His Lys Val Pro Val Lys Leu Glu Lys Thr Thr Asp Gly Ile
 225 230 235 240
 Thr Ile His Phe Glu Asp Gly Thr Ser His Thr Ala Ser Gln Val Ile
 245 250 255
 Trp Ala Thr Gly Arg Arg Pro Asn Val Lys Gly Leu Gln Leu Glu Lys
 260 265 270
 Ala Gly Val Thr Leu Asn Glu Arg Gly Phe Ile Gln Val Asp Glu Tyr
 275 280 285
 Gln Asn Thr Val Val Glu Gly Ile Tyr Ala Leu Gly Asp Val Thr Gly
 290 295 300
 Glu Lys Glu Leu Thr Pro Val Ala Ile Lys Ala Gly Arg Thr Leu Ser
 305 310 315 320
 Glu Arg Leu Phe Asn Gly Lys Thr Thr Ala Lys Met Asp Tyr Ser Thr
 325 330 335
 Ile Pro Thr Val Val Phe Ser His Pro Ala Ile Gly Thr Val Gly Leu
 340 345 350
 Thr Glu Glu Gln Ala Ile Lys Glu Tyr Gly Gln Asp Gln Ile Lys Val
 355 360 365
 Tyr Lys Ser Ser Phe Ala Ser Met Tyr Ser Ala Cys Thr Cys Asn Arg
 370 375 380
 Gln Glu Ser Arg Phe Lys Leu Ile Thr Ala Gly Ser Glu Glu Lys Val
 385 390 395 400
 Val Gly Leu His Gly Ile Gly Tyr Gly Val Asp Glu Met Ile Gln Gly
 405 410 415

Phe Ala Val Ala Ile Lys Met Gly Ala Thr Lys Ala Asp Phe Asp Ala
 420 425 430

Thr Val Ala Ile His Pro Thr Ala Ser Glu Glu Phe Val Thr Met Arg
 435 440 445

<210> 284

<211> 444

<212> PRT

<213> Streptococcus pneumoniae

<400> 284

Met Phe Ser Lys Leu Lys Lys Thr Trp Tyr Ala Asp Asp Phe Ser Tyr
 1 5 10 15

Phe Ile Arg Asn Phe Gly Val Phe Thr Leu Ile Phe Ser Thr Met Thr
 20 25 30

Leu Ile Ile Leu Gln Val Met His Ser Ser Leu Tyr Thr Ser Val Asp
 35 40 45

Asp Lys Leu His Gly Leu Ser Glu Asn Pro Gln Ala Val Ile Gln Leu
 50 55 60

Ala Ile Asn Arg Ala Thr Glu Glu Ile Lys Asp Leu Glu Asn Ala Arg
 65 70 75 80

Ala Asp Ala Ser Lys Val Glu Ile Lys Pro Asn Val Ser Ser Asn Thr
 85 90 95

Glu Val Ile Leu Phe Asp Lys Asp Phe Thr Gln Leu Leu Ser Gly Asn
 100 105 110

Arg Phe Leu Gly Leu Asp Lys Ile Lys Leu Glu Lys Lys Glu Leu Gly
 115 120 125

His Ile Tyr Gln Ile Gln Val Phe Asn Ser Tyr Gly Gln Glu Glu Ile
 130 135 140

Tyr Arg Val Ile Leu Met Glu Thr Asn Ile Ser Ser Val Ser Thr Asn
 145 150 155 160

Ile Lys Tyr Ala Ala Val Leu Ile Asn Thr Ser Gln Leu Glu Gln Ala
 165 170 175

Ser Gln Lys His Glu Gln Leu Ile Val Val Val Met Ala Ser Phe Trp
 180 185 190

Ile Leu Ser Leu Leu Ala Ser Leu Tyr Leu Ala Arg Val Ser Val Arg
 195 200 205

Pro Leu Leu Glu Ser Met Gln Lys Gln Gln Ser Phe Val Glu Asn Ala
 210 215 220

Ser His Glu Leu Arg Thr Pro Leu Ala Val Leu Gln Asn Arg Leu Glu
 225 230 235 240

Thr Leu Phe Arg Lys Pro Glu Ala Thr Ile Met Asp Val Ser Glu Ser
 245 250 255

Ile Ala Ser Ser Leu Glu Glu Val Arg Asn Met Arg Phe Leu Thr Thr
 260 265 270

Ser Leu Leu Asn Leu Ala Arg Arg Asp Asp Gly Ile Lys Pro Glu Leu
 275 280 285

Ala Glu Val Pro Thr Ser Phe Phe Asn Thr Thr Phe Thr Asn Tyr Glu
 290 295 300

Met Ile Ala Ser Glu Asn Asn Arg Val Phe Arg Phe Glu Asn Arg Ile
 305 310 315 320

His Arg Thr Ile Val Thr Asp Gln Leu Leu Leu Lys Gln Leu Met Thr
 325 330 335

Ile Leu Phe Asp Asn Ala Val Lys Tyr Thr Glu Glu Asp Gly Glu Ile
 340 345 350

Asp Phe Leu Ile Ser Ala Thr Asp Arg Asn Leu Tyr Leu Leu Val Ser
 355 360 365

Asp Asn Gly Ile Gly Ile Ser Thr Glu Asp Lys Lys Lys Ile Phe Asp

370 375 380
 Arg Phe Tyr Arg Val Asp Lys Ala Arg Thr Arg Gln Lys Gly Gly Phe
 385 390 395 400
 Gly Leu Gly Leu Ser Leu Ala Lys Gln Ile Val Asp Ala Leu Lys Gly
 405 410 415
 Thr Val Thr Val Lys Asp Asn Lys Pro Lys Gly Thr Ile Phe Glu Val
 420 425 430
 Lys Ile Ala Ile Gln Thr Pro Ser Lys Lys Lys Lys
 435 440
 <210> 285
 <211> 356
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 285
 Met Ile Leu Ser Leu Thr Val His Thr Tyr Phe Ile Ile Phe Ser Ala
 1 5 10 15
 Glu Asn Tyr Tyr Arg Lys Val Thr Lys Arg Ile Lys Ser Leu Phe Ile
 20 25 30
 Phe Lys Ala Trp Leu Ile Leu Glu Lys Cys Gly Ile Ile Phe Leu Met
 35 40 45
 Glu Lys Ile Val Ile Thr Ala Thr Ala Glu Ser Ile Glu Gln Val Glu
 50 55 60
 Gln Leu Leu Glu Ala Gly Val Asp Arg Ile Tyr Val Gly Glu Lys Asp
 65 70 75 80
 Phe Gly Leu Arg Leu Pro Thr Thr Phe Ser Tyr Asp Gln Leu Arg Glu
 85 90 95
 Ile Ala Lys Leu Val His Asp Ala Gly Lys Glu Leu Ile Val Ala Val
 100 105 110
 Asn Ala Leu Met His Gln Asp Met Met Asp Arg Ile Lys Pro Phe Leu

115	120	125
Asn Phe Leu Glu Glu Ile Lys Thr Asp Tyr Ile Thr Ile Gly Asp Ala		
130	135	140
Gly Val Phe Tyr Val Val Asn Arg Asp Gly Tyr Ser Phe Lys Thr Ile		
145	150	155
Tyr Asp Ala Ser Thr Met Val Thr Ser Ser Arg Gln Ile Asn Phe Trp		
165	170	175
Gly Gln Lys Ala Gly Ala Ser Glu Ala Val Leu Ala Arg Glu Ile Pro		
180	185	190
Ser Ala Glu Leu Phe Lys Met Pro Glu Ile Leu Glu Ile Pro Ala Glu		
195	200	205
Val Leu Val Tyr Gly Ala Ser Val Ile His His Ser Lys Arg Pro Leu		
210	215	220
Leu Gln Asn Tyr Tyr Asn Phe Thr His Ile Asp Asp Glu Lys Thr His		
225	230	235
Lys Arg Asp Leu Phe Leu Ala Glu Pro Ser Asp Pro Glu Ser His Tyr		
245	250	255
Ser Ile Phe Glu Asp Asn His Gly Thr His Ile Phe Ala Asn Asn Asp		
260	265	270
Leu Asp Leu Met Ile Lys Leu Thr Glu Leu Val Glu His Gly Phe Thr		
275	280	285
Arg Trp Lys Leu Glu Gly Leu Tyr Thr Pro Gly Gln Asn Phe Val Glu		
290	295	300
Ile Ala Lys Leu Phe Ile Gln Ala Arg Ser Leu Ile Gln Glu Gly Asn		
305	310	315
Phe Ser His Ala Gln Ala Phe Leu Leu Asp Glu Glu Val Arg Lys Leu		
325	330	335

His Pro Lys Asn Arg Phe Leu Asp Thr Gly Phe Tyr Asp Tyr Asp Pro
 340 345 350

Asp Met Val Arg
 355

<210> 286
 <211> 229
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 286

Met Thr Met Asn Phe Ser Phe Leu Pro Lys Tyr Leu Pro Tyr Phe Asn
 1 5 10 15

Tyr Gly Ala Val Val Thr Ile Leu Ile Ser Ile Cys Val Ile Phe Leu
 20 25 30

Gly Thr Ile Leu Gly Val Val Leu Ala Phe Gly Gln Arg Ser Lys Phe
 35 40 45

Lys Pro Leu Val Trp Leu Ala Asn Leu Tyr Val Trp Ile Phe Arg Gly
 50 55 60

Thr Pro Met Met Val Gln Ile Met Ile Ala Phe Ala Leu Met His Ile
 65 70 75 80

Asn Ala Pro Thr Ile Gln Ile Gly Ile Leu Gly Val Asp Phe Ser Arg
 85 90 95

Leu Ile Pro Gly Ile Leu Ile Ile Ser Met Asn Ser Gly Ala Tyr Val
 100 105 110

Ser Glu Thr Val Arg Ala Gly Ile Asn Ala Val Pro Lys Gly Gln Leu
 115 120 125

Glu Ala Ala Tyr Ser Leu Gly Ile Arg Pro Lys Asn Ala Met Arg Tyr
 130 135 140

Val Ile Leu Pro Gln Ala Val Lys Asn Ile Leu Pro Ala Leu Gly Asn
 145 150 155 160

Glu Phe Ile Thr Ile Ile Lys Asp Ser Ser Leu Leu Ser Ala Ile Gly
165 170 175

Val Met Glu Leu Trp Asn Gly Ala Thr Thr Val Ser Thr Thr Thr Tyr
180 185 190

Leu Pro Leu Thr Pro Leu Leu Phe Ala Ala Phe Tyr Tyr Leu Ile Met
195 200 205

Thr Ser Ile Leu Thr Val Ala Leu Lys Ala Phe Glu Lys His Met Gly
210 215 220

Gln Gly Asp Lys Lys
225

<210> 287

<211> 244

<212> PRT

<213> Streptococcus pneumoniae

<400> 287

Met Thr Glu Thr Leu Ile Lys Ile Glu Asn Leu His Lys Ser Phe Gly
1 5 10 15

Lys Asn Glu Val Leu Lys Gly Ile Asn Leu Glu Ile Lys Arg Gly Glu
20 25 30

Val Val Val Ile Ile Gly Pro Ser Gly Ser Gly Lys Ser Thr Leu Leu
35 40 45

Arg Ser Met Asn Leu Leu Glu Glu Ala Thr Lys Gly Lys Val Ile Phe
50 55 60

Glu Gly Val Asp Ile Thr Asp Lys Lys Asn Asp Leu Phe Ala Met Arg
65 70 75 80

Glu Lys Met Gly Met Val Phe Gln Gln Phe Asn Leu Phe Pro Asn Met
85 90 95

Thr Val Met Glu Asn Ile Thr Leu Ser Pro Ile Lys Thr Lys Gly Asp
100 105 110

Ser Lys Ala Val Ala Glu Lys Arg Ala Gln Glu Leu Leu Glu Lys Val
 115 120 125

Gly Leu Pro Asp Lys Ala Asp Ala Tyr Pro Gln Ser Leu Ser Gly Gly
 130 135 140

Gln Gln Gln Arg Ile Ala Ile Ala Arg Gly Leu Ala Met Glu Pro Asp
 145 150 155 160

Val Leu Leu Phe Asp Glu Pro Thr Ser Ala Leu Asp Pro Glu Met Val
 165 170 175

Gly Glu Val Leu Ala Val Met Gln Asp Leu Ala Lys Ser Gly Met Thr
 180 185 190

Met Val Ile Val Thr His Glu Met Gly Phe Ala Arg Glu Val Ala Asp
 195 200 205

Arg Val Ile Phe Met Ala Asp Gly Val Val Val Glu Asp Gly Thr Pro
 210 215 220

Glu Gln Ile Phe Glu Gln Thr Gln Gly Gln Arg Thr Lys Asp Phe Leu
 225 230 235 240

Ser Lys Val Leu

<210> 288

<211> 78

<212> PRT

<213> Streptococcus pneumoniae

<400> 288

Met Lys Ile Leu Lys Arg Tyr Ile Leu Glu Leu Cys Phe Ile Leu Ser
 1 5 10 15

Phe Ala Leu Pro Phe Ile Lys Gly Thr Asn Ala Asp Asn Gly Arg Cys
 20 25 30

Phe Val Glu Thr Tyr Tyr Gly Phe Thr Phe Leu Met Glu His Ala Ile
 35 40 45

Val Thr Ala Val Phe Ile Cys Ser Phe Leu Ile Ala Phe Leu Leu Lys
 50 55 60

Asn Asp Gly Arg Asn Gly Leu Leu Arg Val Val Ile Ala Phe
 65 70 75

<210> 289
 <211> 511
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 289

Met Ala His Glu Asn Val Ile Glu Met Arg Asp Ile Thr Lys Val Phe
 1 5 10 15

Gly Gly Phe Val Ala Asn Asp Lys Ile Asn Leu His Leu Arg Lys Gly
 20 25 30

Glu Ile His Ala Leu Leu Gly Glu Asn Gly Ala Gly Lys Ser Thr Leu
 35 40 45

Met Asn Met Leu Ala Gly Leu Leu Glu Pro Thr Ser Gly Glu Ile Ala
 50 55 60

Val Asn Gly Gln Val Val Asn Leu Asp Ser Pro Ser Lys Ala Ala Ser
 65 70 75 80

Leu Gly Ile Gly Met Val His Gln His Phe Met Leu Val Glu Ala Phe
 85 90 95

Thr Val Ala Glu Asn Ile Ile Leu Gly Ser Glu Leu Thr Lys Asn Gly
 100 105 110

Val Leu Asp Ile Ala Gly Ala Ser Lys Glu Ile Lys Ala Leu Ser Glu
 115 120 125

Arg Tyr Gly Leu Ala Val Asp Pro Ser Ala Lys Val Ala Asp Ile Ser
 130 135 140

Val Gly Ala Gln Gln Arg Val Glu Ile Leu Lys Thr Leu Tyr Arg Gly
 145 150 155 160

Ala Asp Ile Leu Ile Phe Asp Glu Pro Thr Ala Val Leu Thr Pro Ser
165 170 175

Glu Ile Asp Glu Leu Met Ala Ile Met Lys Asn Leu Val Lys Glu Gly
180 185 190

Lys Ser Ile Ile Leu Ile Thr His Lys Leu Asp Glu Ile Arg Ala Val
195 200 205

Ser Asp Arg Val Thr Val Ile Arg Arg Gly Lys Ser Ile Glu Thr Val
210 215 220

Glu Ile Ala Gly Ala Thr Asn Ala Asp Leu Ala Glu Met Met Val Gly
225 230 235 240

Arg Ser Val Ser Phe Lys Thr Glu Lys Gln Ala Ser Lys Pro Lys Glu
245 250 255

Val Val Leu Ser Ile Lys Asp Leu Val Val Asn Glu Asn Arg Gly Val
260 265 270

Pro Ala Val Lys Asn Leu Ser Leu Asp Val Arg Ala Gly Glu Ile Val
275 280 285

Gly Ile Ala Gly Ile Asp Gly Asn Gly Gln Ser Glu Leu Ile Gln Ala
290 295 300

Ile Thr Gly Leu Arg Lys Val Glu Ser Gly Ser Ile Glu Leu Lys Gly
305 310 315 320

Asp Ser Ile Val Gly Leu His Pro Arg Gln Ile Thr Glu Leu Ser Val
325 330 335

Gly His Val Pro Glu Asp Arg His Arg Asp Gly Leu Ile Leu Glu Met
340 345 350

Met Ile Ser Glu Asn Ile Ala Leu Gln Thr Tyr Tyr Lys Glu Pro His
355 360 365

Ser Lys Asn Gly Ile Leu Asn Tyr Ser Asn Ile Thr Ser Tyr Ala Lys
370 375 380

Lys Leu Met Glu Glu Phe Asp Val Arg Ala Ala Ser Glu Leu Val Pro
 385 390 395 400

Ala Ala Ala Leu Ser Gly Gly Asn Gln Gln Lys Ala Ile Ile Ala Arg
 405 410 415

Glu Ile Asp Arg Asp Pro Asp Leu Leu Ile Val Ser Gln Pro Thr Arg
 420 425 430

Gly Leu Asp Val Gly Ala Ile Glu Tyr Ile His Lys Arg Leu Ile Glu
 435 440 445

Glu Arg Asp Asn Gly Lys Ala Val Leu Val Val Ser Phe Glu Leu Asp
 450 455 460

Glu Ile Leu Asn Val Ser Asp Arg Ile Ala Val Ile His Asp Gly Lys
 465 470 475 480

Ile Gln Gly Ile Val Ser Pro Glu Thr Thr Asn Lys Gln Glu Leu Gly
 485 490 495

Val Leu Met Ala Gly Gly Asn Leu Gly Lys Glu Lys Ser Asp Val
 500 505 510

<210> 290

<211> 307

<212> PRT

<213> Streptococcus pneumoniae

<400> 290

Met Thr Glu Leu Ala Lys Gln Leu Leu Glu Leu Thr Tyr Ile Val Ile
 1 5 10 15

Gly Cys Gln Phe Leu His Thr Ala Tyr Cys Ser Tyr Lys Asp Lys Thr
 20 25 30

Asn Pro Val Arg Leu Gly Thr Ser Ala Phe Trp Thr Leu Leu Ser Ile
 35 40 45

Thr Phe Ile Gly Gly Ser Tyr Met Pro Asn Met Ser Ile Gly Ile Ile
 50 55 60

Val Ile Leu Leu Ser Leu Leu Thr Leu Phe Lys Gln Val Arg Ile Gly
 65 70 75 80

Thr Leu Pro Ser Leu Asp Glu Met Lys Ala Asn Ile Glu Ser Asn Arg
 85 90 95

Leu Lys Asn Lys Ile Phe Ile Pro Val Met Leu Met Ala Ile Leu Ala
 100 105 110

Leu Val Leu Ala Gln Met Ile Pro Glu Phe Ser Lys Ile Ser Ile Ser
 115 120 125

Leu Ala Ala Leu Phe Ala Thr Ile Ser Val Leu Val Ile Thr Asn Ser
 130 135 140

His Pro Lys Ser Leu Leu Ser Glu Asn Asn Arg Met Thr Gln Gln Val
 145 150 155 160

Ser Thr Ser Gly Ile Val Pro Gln Leu Leu Gly Ala Leu Gly Ala Ile
 165 170 175

Phe Thr Val Ala Gly Val Gly Asp Val Ile Ser His Leu Ile Ser Gly
 180 185 190

Ile Val Pro Ser Asp Ser Arg Phe Ile Gly Val Leu Ala Tyr Val Leu
 195 200 205

Gly Met Val Leu Phe Thr Met Ile Met Gly Asn Ala Phe Ala Ala Phe
 210 215 220

Thr Val Ile Thr Ala Gly Val Gly Val Pro Phe Val Phe Ala Leu Gly
 225 230 235 240

Ala Asn Pro Ile Val Ala Gly Ala Leu Ala Met Thr Ala Gly Tyr Cys
 245 250 255

Gly Thr Leu Leu Thr Pro Met Ala Ala Asn Phe Asn Ala Leu Pro Ala
 260 265 270

Ala Leu Met Asp Met Lys Asp Gln Asn Gly Val Ile Lys Ala Gln Ala
 275 280 285

Gly Val Ala Leu Val Met Ile Val Ile His Ile Phe Leu Met Tyr Phe
 290 295 300

Leu Ala Phe
 305

<210> 291
 <211> 369
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 291

Met Phe Arg Arg Asn Lys Leu Phe Phe Trp Thr Thr Glu Ile Leu Leu
 1 5 10 15

Leu Thr Ile Ile Phe Tyr Leu Trp Arg Gln Met Gly Ser Leu Ile Asn
 20 25 30

Pro Phe Val Ser Val Leu Asn Thr Ile Met Ile Pro Phe Leu Leu Gly
 35 40 45

Gly Phe Phe Tyr Tyr Leu Thr Asn Pro Ile Val Thr Phe Leu Asn Lys
 50 55 60

Val Cys Lys Leu Asn Arg Leu Leu Gly Ile Leu Ile Thr Leu Cys Thr
 65 70 75 80

Leu Val Trp Gly Met Val Ile Gly Val Val Tyr Leu Leu Pro Ile Leu
 85 90 95

Ile Asn Gln Leu Ser Ser Leu Ile Ile Ser Ser Gln Thr Ile Tyr Ser
 100 105 110

Arg Val Gln Asp Leu Ile Ile Asp Leu Ser Asn Tyr Pro Ala Leu Gln
 115 120 125

Asn Leu Asp Val Glu Ala Thr Ile Gln Gln Leu Asn Leu Ser Tyr Val
 130 135 140

Asp Ile Leu Gln Asn Ile Leu Asn Ser Val Ser Asn Ser Val Gly Ser
 145 150 155 160

Val Leu Ser Ala Leu Ile Ser Thr Val Leu Ile Leu Ile Met Thr Pro
 165 170 175

Val Phe Leu Val Tyr Phe Leu Leu Asp Gly His Lys Phe Leu Pro Met
 180 185 190

Leu Glu Arg Thr Ile Leu Lys Arg Asp Arg Leu His Ile Ala Gly Leu
 195 200 205

Leu Lys Asn Leu Asn Ala Thr Ile Ala Arg Tyr Ile Ser Gly Val Ser
 210 215 220

Ile Asp Ala Ile Ile Ile Gly Cys Leu Ala Tyr Ile Gly Tyr Ser Ile
 225 230 235 240

Ile Gly Leu Lys Tyr Ala Leu Val Phe Ala Ile Phe Ser Gly Val Ala
 245 250 255

Asn Leu Ile Pro Tyr Val Gly Pro Ser Ile Gly Leu Ile Pro Met Ile
 260 265 270

Ile Ala Asn Ile Phe Thr Asp Pro His Arg Leu Leu Ile Ala Val Ile
 275 280 285

Tyr Met Leu Val Val Gln Gln Val Asp Gly Asn Ile Leu Tyr Pro Arg
 290 295 300

Ile Val Gly Ser Val Met Lys Val His Pro Ile Thr Ile Leu Val Leu
 305 310 315 320

Leu Leu Leu Ser Ser Asn Ile Tyr Gly Val Val Gly Met Ile Val Ala
 325 330 335

Val Pro Thr Tyr Ser Ile Leu Lys Glu Ile Ser Lys Phe Leu Ser His
 340 345 350

Leu Tyr Glu Asn His Lys Ile Met Lys Glu Arg Glu Arg Glu Leu Ala
 355 360 365

Lys

<210> 292
 <211> 662
 <212> PRT
 <213> *Streptococcus pneumoniae*
 <400> 292
 Met Phe Arg Leu Thr Asn Lys Leu Ala Val Ser Asn Leu Ile Lys Asn
 1 5 10 15
 Arg Lys Leu Tyr Tyr Pro Phe Ala Leu Ala Val Leu Leu Ala Val Thr
 20 25 30
 Ile Thr Tyr Leu Phe Tyr Ser Leu Thr Phe Asn Pro Lys Ile Ala Glu
 35 40 45
 Ile Arg Gly Gly Thr Thr Ile Gln Ala Thr Leu Gly Phe Gly Met Phe
 50 55 60
 Val Val Thr Leu Ala Ser Ala Ile Ile Val Leu Tyr Ala Asn Ser Phe
 65 70 75 80
 Val Met Lys Asn Arg Ser Lys Glu Leu Gly Ile Tyr Gly Met Leu Gly
 85 90 95
 Leu Glu Lys Arg His Leu Ile Ser Met Thr Phe Lys Glu Leu Val Val
 100 105 110
 Phe Gly Ile Leu Thr Val Gly Ala Gly Ile Gly Ile Gly Ala Leu Phe
 115 120 125
 Asp Lys Leu Ile Phe Ala Phe Leu Leu Lys Leu Met Lys Leu Lys Val
 130 135 140
 Glu Leu Val Ala Thr Phe Gln Met Asn Val Val Ile Ala Val Leu Val
 145 150 155 160
 Val Phe Gly Leu Ile Phe Leu Gly Leu Met Phe Leu Asn Ala Leu Arg
 165 170 175
 Ile Ala Arg Met Asn Ala Leu Gln Leu Ser Arg Glu Lys Ala Ser Gly

180	185	190
Glu Lys Arg 195	Gly Arg Phe Leu Pro Leu Gln Thr Ile Leu Gly Ser Ile 200	205
Ser Leu Gly Ile Gly Tyr Tyr Leu Ala Leu Thr Val Thr Asp Pro Leu 210	215	220
Thr Ala Leu Thr Thr Phe Phe Leu Ala Val Leu Leu Val Ile Phe Gly 225	230	235 240
Thr Tyr Leu Leu Phe Asn Ala Gly Ile Thr Val Phe Leu Gln Ile Leu 245	250	255
Lys Lys Asn Lys Lys Tyr Tyr Tyr Gln Pro Asn Asn Leu Ile Ser Val 260	265	270
Ser Asn Leu Ile Phe Arg Met Lys Lys Asn Ala Val Gly Leu Ala Thr 275	280	285
Ile Ala Ile Leu Ser Thr Met Val Leu Val Thr Met Ser Ala Ala Thr 290	295	300
Ser Ile Phe Asn Ser Ala Glu Ser Phe Lys Lys Val Leu Asn Pro His 305	310	315 320
Asp Phe Gly Val Ser Gly Gln Asn Val Glu Lys Glu Asp Leu Asp Lys 325	330	335
Leu Leu Ser Gln Phe Ala Ser Asp Lys Gly Tyr Ser Val Lys Glu Lys 340	345	350
Glu Val Leu Arg Tyr Ser Asn Phe Gly Ile Ala Asn Gln Glu Gly Thr 355	360	365
Lys Leu Thr Ile Phe Glu Lys Gly Gln Asn Arg Val Gln Pro Thr Thr 370	375	380
Val Phe Met Val Phe Asp Gln Lys Asp Tyr Glu Asn Met Thr Gly Gln 385	390	395 400

Lys Leu Ser Leu Ser Gly Asn Glu Val Gly Leu Phe Ala Lys Asn Asp
 405 410 415

Gly Leu Lys Gly Gln Lys Ala Leu Thr Leu Asn Asp His Gln Phe Ser
 420 425 430

Val Lys Glu Glu Phe Asn Lys Asp Phe Ile Val Asn His Val Pro Asn
 435 440 445

Lys Phe Asn Ile Leu Thr Thr Asp Tyr Asn Tyr Leu Val Val Pro Asp
 450 455 460

Leu Gln Ala Phe Leu Asp Gln Phe Pro Asp Ser Ala Ile Tyr Asn Gln
 465 470 475 480

Phe Tyr Gly Gly Met Asn Val Asn Val Ser Glu Glu Glu Gln Leu Lys
 485 490 495

Val Ala Glu Glu Tyr Glu Asn Tyr Leu Asn Gln Phe Asn Ala Gln Leu
 500 505 510

Asp Thr Glu Gly Ser Tyr Val Tyr Gly Ser Asn Leu Ala Asp Ala Ser
 515 520 525

Ser Gln Met Ser Ala Leu Phe Gly Gly Val Phe Phe Ile Gly Ile Phe
 530 535 540

Leu Ser Ile Ile Phe Met Val Gly Thr Val Leu Val Ile Tyr Tyr Lys
 545 550 555 560

Gln Ile Ser Glu Gly Tyr Glu Asp Arg Glu Arg Phe Ile Ile Leu Gln
 565 570 575

Lys Val Gly Leu Asp Gln Lys Gln Ile Lys Gln Thr Ile Asn Lys Gln
 580 585 590

Val Leu Thr Val Phe Phe Leu Pro Leu Leu Phe Ala Phe Ile His Leu
 595 600 605

Ala Phe Ala Tyr His Met Leu Ser Leu Ile Leu Lys Val Ile Gly Val
 610 615 620

Leu Asp Thr Thr Met Met Leu Ile Val Thr Leu Ser Ile Cys Ala Ile
625 630 635 640

Phe Leu Ile Ala Tyr Val Leu Ile Phe Met Ile Thr Ser Arg Ser Tyr
645 650 655

Arg Lys Ile Val Gln Met
660

<210> 293

<211> 419

<212> PRT

<213> Streptococcus pneumoniae

<400> 293

Met Ser Arg Leu Leu Val Ile Gly Cys Gly Gly Val Ala Gln Val Ala
1 5 10 15

Ile Ser Lys Ile Cys Gln Asp Ser Glu Thr Phe Thr Glu Ile Met Ile
20 25 30

Ala Ser Arg Thr Lys Ser Lys Cys Asp Asp Leu Lys Ala Lys Leu Glu
35 40 45

Gly Lys Thr Ser Thr Lys Ile Glu Thr Ala Ala Leu Asp Ala Asp Lys
50 55 60

Val Glu Glu Val Ile Ala Leu Ile Glu Ser Tyr Lys Pro Glu Ala Val
65 70 75 80

Leu Asn Val Ala Leu Pro Tyr Gln Asp Leu Thr Ile Met Asp Ala Cys
85 90 95

Leu Ala Thr Gly Val His Tyr Ile Asp Thr Ala Asn Tyr Glu Ala Glu
100 105 110

Asp Thr Glu Asp Pro Glu Trp Arg Ala Ile Tyr Glu Lys Arg Cys Lys
115 120 125

Glu Leu Gly Phe Thr Ala Tyr Phe Asp Tyr Ser Trp Gln Trp Ala Tyr
130 135 140

Gln Glu Lys Phe Lys Glu Ala Gly Leu Thr Ala Leu Leu Gly Ser Gly
 145 150 155 160

Phe Asp Pro Gly Val Thr Ser Val Phe Ser Ala Tyr Ala Leu Lys His
 165 170 175

Tyr Phe Asp Glu Ile His Tyr Ile Asp Ile Leu Asp Cys Asn Gly Gly
 180 185 190

Asp His Gly Tyr Pro Phe Ala Thr Asn Phe Asn Pro Glu Ile Asn Leu
 195 200 205

Arg Glu Val Ser Ala Pro Gly Ser Tyr Trp Glu Asp Gly Lys Trp Val
 210 215 220

Glu Val Glu Ala Met Ser Ile Lys Arg Glu Tyr Asp Phe Pro Gln Val
 225 230 235 240

Gly Gln Lys Asp Met Tyr Leu Leu His His Glu Glu Ile Glu Ser Leu
 245 250 255

Ala Lys Asn Ile Pro Gly Val Lys Arg Ile Arg Phe Phe Met Thr Phe
 260 265 270

Gly Gln Ser Tyr Leu Thr His Met Lys Cys Leu Glu Asn Val Gly Leu
 275 280 285

Leu Arg Thr Asp Thr Ile Asn Phe Asn Gly Gln Glu Ile Val Pro Ile
 290 295 300

Gln Phe Leu Lys Ala Leu Leu Pro Asp Pro Ala Ser Leu Gly Pro Arg
 305 310 315 320

Thr Val Gly Lys Thr Asn Ile Gly Cys Ile Phe Thr Gly Val Lys Asp
 325 330 335

Gly Val Lys Lys Thr Ile Tyr Ile Tyr Asn Val Cys Asp His Gln Glu
 340 345 350

Cys Tyr Ala Glu Val Gly Ser Gln Ala Ile Ser Tyr Thr Thr Gly Val
 355 360 365

Pro Ala Met Ile Gly Thr Lys Leu Val Met Asn Gly Thr Trp Lys Gln
 370 375 380

Ala Gly Val Tyr Asn Leu Glu Glu Leu Asp Pro Asp Pro Phe Met Glu
 385 390 395 400

Ala Leu Asn Glu Tyr Gly Leu Pro Trp Val Val Val Glu Asn Pro Gln
 405 410 415

Met Val Asp

<210> 294

<211> 216

<212> PRT

<213> Streptococcus pneumoniae

<400> 294

Met Glu Ala Ile Ile Glu Lys Ile Lys Glu Tyr Lys Ile Ile Val Ile
 1 5 10 15

Cys Thr Gly Leu Gly Leu Leu Val Gly Gly Phe Phe Leu Leu Lys Pro
 20 25 30

Ala Pro Gln Thr Pro Val Lys Glu Thr Asn Leu Gln Ala Glu Val Ala
 35 40 45

Ala Val Ser Lys Asp Ser Ser Thr Glu Lys Glu Val Lys Lys Glu Glu
 50 55 60

Lys Glu Glu Pro Leu Glu Gln Asp Leu Ile Thr Val Asp Val Lys Gly
 65 70 75 80

Ala Val Lys Ser Pro Gly Ile Tyr Asp Leu Pro Val Gly Ser Arg Val
 85 90 95

Asn Asp Ala Val Gln Lys Ala Gly Gly Leu Thr Glu Gln Ala Asp Ser
 100 105 110

Lys Ser Leu Asn Leu Ala Gln Lys Val Ser Asp Glu Ala Leu Val Tyr
 115 120 125

Val Pro Thr Lys Gly Glu Glu Ala Val Ser Gln Gln Thr Gly Ser Gly
 130 135 140

Thr Ala Ser Ser Thr Ser Lys Glu Lys Lys Val Asn Leu Asn Lys Ala
 145 150 155 160

Ser Leu Glu Glu Leu Lys Gln Val Lys Gly Leu Gly Gly Lys Arg Ala
 165 170 175

Gln Asp Ile Ile Asp His Arg Glu Ala Asn Gly Lys Phe Lys Ser Val
 180 185 190

Asp Glu Leu Lys Lys Val Ser Gly Ile Gly Gly Lys Thr Ile Glu Lys
 195 200 205

Leu Lys Asp Tyr Val Thr Val Asp
 210 215

<210> 295

<211> 502

<212> PRT

<213> Streptococcus pneumoniae

<400> 295

Met Leu Gln Trp Ile Lys Asn Phe Ser Ile Pro Leu Ile Tyr Leu Ser
 1 5 10 15

Phe Leu Leu Leu Trp Leu Tyr Tyr Ala Ile Phe Ser Ala Ser Tyr Leu
 20 25 30

Ala Leu Leu Gly Phe Val Phe Leu Leu Val Cys Leu Phe Ile Gln Phe
 35 40 45

Pro Trp Lys Ser Ala Gly Lys Val Leu Ile Ile Cys Gly Ile Phe Gly
 50 55 60

Phe Trp Phe Val Phe Gln Asn Trp Gln Gln Ser Gln Ala Ser Gln Asn
 65 70 75 80

Leu Ala Asp Ser Val Glu Arg Val Arg Ile Leu Pro Asp Thr Ile Lys
 85 90 95

Val Asn Gly Asp Ser Leu Ser Phe Arg Gly Lys Ser Asn Gly Arg Ala
 100 105 110

Phe Gln Val Tyr Tyr Lys Leu Gln Ser Glu Glu Glu Lys Glu Ala Phe
 115 120 125

Gln Ala Leu Thr Asp Leu His Glu Ile Gly Leu Glu Gly Lys Leu Ser
 130 135 140

Glu Pro Glu Gly Gln Arg Asn Phe Gly Gly Phe Asn Tyr Gln Ala Tyr
 145 150 155 160

Leu Lys Thr Gln Gly Ile Tyr Gln Thr Leu Asn Ile Lys Thr Ile Gln
 165 170 175

Ser Leu Gln Lys Ile Gly Ser Trp Asp Ile Gly Glu Asn Leu Ser Ser
 180 185 190

Leu Arg Arg Lys Ala Val Val Trp Ile Lys Thr His Phe Pro Asp Pro
 195 200 205

Met Gly Asn Tyr Met Thr Gly Leu Leu Leu Gly His Leu Asp Thr Asp
 210 215 220

Phe Glu Glu Met Asn Glu Leu Tyr Ser Ser Leu Gly Ile Ile His Leu
 225 230 235 240

Phe Ala Leu Ser Gly Met Gln Val Gly Phe Phe Met Asn Gly Phe Lys
 245 250 255

Lys Leu Leu Leu Arg Leu Gly Leu Thr Gln Glu Lys Leu Lys Trp Leu
 260 265 270

Thr Tyr Pro Phe Ser Leu Ile Tyr Ala Gly Leu Thr Gly Phe Ser Ala
 275 280 285

Ser Val Ile Arg Ser Leu Leu Gln Lys Leu Leu Ala Gln His Gly Val
 290 295 300

Lys Gly Leu Asp Asn Phe Ala Leu Thr Val Leu Val Leu Phe Ile Val

Met	Pro	Asn	Phe	Phe	Leu	Thr	Ala	Gly	Gly	Val	Leu	Ser	Cys	Ala	Tyr	305	310	315	320
			325						330					335					
Ala	Phe	Ile	Leu	Thr	Met	Thr	Ser	Lys	Glu	Gly	Glu	Gly	Leu	Lys	Ala				
			340					345					350						
Val	Thr	Ser	Glu	Ser	Leu	Val	Ile	Ser	Leu	Gly	Ile	Leu	Pro	Ile	Leu				
			355				360					365							
Ser	Phe	Tyr	Phe	Ala	Glu	Phe	Gln	Pro	Trp	Ser	Ile	Leu	Leu	Thr	Phe				
			370			375					380								
Val	Phe	Ser	Phe	Leu	Phe	Asp	Leu	Val	Phe	Leu	Pro	Leu	Leu	Ser	Ile				
					390				395						400				
Leu	Phe	Val	Leu	Ser	Phe	Leu	Tyr	Pro	Val	Ile	Gln	Leu	Asn	Phe	Ile				
			405						410					415					
Phe	Glu	Trp	Leu	Glu	Gly	Ile	Ile	Arg	Leu	Val	Ser	Gln	Val	Ala	Arg				
			420					425					430						
Arg	Pro	Leu	Val	Phe	Gly	Gln	Pro	Asn	Ala	Trp	Leu	Leu	Ile	Leu	Leu				
			435				440					445							
Leu	Ile	Ser	Leu	Ala	Leu	Val	Tyr	Asp	Leu	Arg	Lys	Asn	Ile	Lys	Gly				
			450			455					460								
Leu	Thr	Val	Leu	Ser	Leu	Leu	Ile	Thr	Gly	Leu	Phe	Phe	Leu	Thr	Lys				
					470					475					480				
Tyr	Pro	Leu	Glu	Asn	Glu	Ile	Thr	Met	Leu	Asp	Val	Gly	Gln	Gly	Glu				
			485						490					495					
Ser	Ile	Phe	Tyr	Gly	Met														
			500																

<400> 296

Met Tyr Asn Leu Leu Leu Thr Ile Leu Leu Val Leu Ser Val Val Ile
 1 5 10 15

Val Ile Ala Ile Phe Met Gln Pro Thr Lys Asn Gln Ser Ser Asn Val
 20 25 30

Phe Asp Ala Ser Ser Gly Asp Leu Phe Glu Arg Ser Lys Ala Arg Gly
 35 40 45

Phe Glu Ala Val Met Gln Arg Leu Thr Gly Ile Leu Val Phe Phe Trp
 50 55 60

Leu Ala Ile Ala Leu Ala Leu Thr Val Leu Ser Ser Arg
 65 70 75

<210> 297

<211> 280

<212> PRT

<213> Streptococcus pneumoniae

<400> 297

Met Leu Ser Trp Leu Ala Arg Val Ile Lys Gly Ile Val Ile Ala Leu
 1 5 10 15

Gly Phe Ile Leu Pro Gly Ile Ser Gly Gly Val Leu Ala Ala Ile Leu
 20 25 30

Gly Ile Tyr Glu Arg Met Ile Gly Phe Leu Ala His Pro Phe Lys Asp
 35 40 45

Phe Lys Glu Asn Val Leu Tyr Phe Ile Pro Val Ala Ile Gly Met Leu
 50 55 60

Leu Gly Ile Gly Leu Phe Ser Tyr Pro Ile Glu Tyr Leu Leu Glu Asn
 65 70 75 80

Tyr Gln Val Phe Val Leu Trp Ser Phe Ala Gly Ala Ile Ile Gly Thr
 85 90 95

Val Pro Ser Leu Leu Lys Glu Ser Thr Arg Glu Ser Asp Arg Asp Lys

100	105	110
Ile Asp Leu Ala Trp Leu Trp Thr	Thr Phe Ile Ile Ser Gly Leu Gly	
115	120	125
Leu Tyr Ala Leu Asn Phe Val Val Gly Thr Leu Ser Ala Ser Phe Leu		
130	135	140
Asn Phe Val Leu Ala Gly Ala Leu Leu Ala Leu Gly Val Leu Val Pro		
145	150	155
Gly Leu Ser Pro Ser Asn Leu Leu Leu Ile Leu Gly Leu Tyr Ala Pro		
165	170	175
Met Leu Thr Gly Phe Lys Thr Phe Asp Phe Leu Gly Thr Phe Phe Pro		
180	185	190
Ile Gly Ile Gly Ala Gly Ala Thr Leu Ile Val Phe Ser Lys Leu Ile		
195	200	205
Asp Tyr Ala Leu Asn Asn Tyr His Ser Arg Val Tyr His Phe Ile Ile		
210	215	220
Gly Ile Val Leu Ser Ser Thr Leu Leu Ile Leu Ile Pro Asn Ala Gly		
225	230	235
Asn Ala Glu Ser Ile Gln Tyr Thr Gly Leu Ser Leu Val Gly Tyr Val		
245	250	255
Ile Ile Ala Phe Phe Phe Ala Leu Gly Ile Trp Leu Gly Ile Trp Met		
260	265	270
Ser Gln Leu Glu Asp Lys Tyr Lys		
275	280	
<210> 298		
<211> 210		
<212> PRT		
<213> Streptococcus pneumoniae		
<400> 298		
Met Phe Tyr Leu Ser Leu Ser Arg Ile Ala Leu Ser Ser Ser Thr Ser		

1	5	10	15
Leu Val Ser	Val Ser Ala Glu Pro Phe Ser Ser Phe Thr Lys Ser Arg		
	20	25	30
Val Ser Trp	Arg Arg Phe Trp Ala Leu Ala Arg Thr Phe Leu Ser Ala		
	35	40	45
Phe Ser Ala Ser Ser Cys	Pro Arg Thr Leu Ile Asn Ser Val Leu Asn		
	50	55	60
Cys Trp Ile Ser Asp Ser	Phe Leu Arg Arg Ile Ser Gln Lys Ala Ile		
	65	70	75
Thr Pro Arg Arg Ala Ser Arg Leu Thr Thr Ile Thr Pro Ala Gly Thr			
	85	90	95
Glu Phe Val Ser Val Ile Leu Ser Glu Ser Leu Leu Ser Ser Val Pro			
	100	105	110
Cys Phe Ala Ser Phe Leu Ser Cys Ala Gly Leu Leu Ser Leu Ala Phe			
	115	120	125
Ala Phe Thr Ser Leu Arg Glu Ser Lys Ala Ala Gln Pro Ser Gln Thr			
	130	135	140
Leu Leu Gln Tyr Ala Asp Leu Thr Leu Ser Arg His Tyr Leu Pro Glu			
	145	150	155
Leu Phe Glu His Leu Gly Gly Gln Pro Trp Leu His Arg Phe Ser Asp			
	165	170	175
Gln Ile Leu Leu Pro Lys Leu Ser Ser Val Gly Leu Thr Leu Asp Ser			
	180	185	190
Arg His Glu Val Gln Thr Cys Gln Leu Ala Leu Glu Leu Val Cys Ser			
	195	200	205
Leu Ser			
	210		

<210> 299

<211> 235

<212> PRT

<213> Streptococcus pneumoniae

<400> 299

Met Glu Thr Ile Val Phe Leu Ile Ser Val Phe Leu Ala Gly Val Leu
 1 5 10 15

Ser Phe Phe Ser Pro Cys Ile Phe Pro Leu Leu Pro Val Tyr Ala Gly
 20 25 30

Ile Leu Leu Asp Asp Gln Glu Ser Ala Lys Ser Phe Ser Leu Phe Gly
 35 40 45

Arg Lys Val Leu Trp Ser Gly Leu Ile Arg Thr Leu Cys Phe Ile Ala
 50 55 60

Gly Ile Ser Leu Ile Phe Phe Ile Leu Gly Phe Gly Ala Gly Tyr Phe
 65 70 75 80

Gly His Ile Leu Tyr Ala Asn Trp Phe Arg Tyr Gly Met Gly Ala Ile
 85 90 95

Ile Ile Ile Leu Gly Leu His Gln Met Glu Ile Phe His Leu Lys Lys
 100 105 110

Leu Glu Val Gln Lys Ser Phe Thr Phe Lys Lys Ser Asp Ser Asn Arg
 115 120 125

Tyr Trp Ser Ala Phe Leu Leu Gly Ile Thr Phe Ser Phe Gly Trp Thr
 130 135 140

Pro Cys Ile Gly Pro Val Leu Ser Ser Val Leu Ala Leu Ala Ala Ser
 145 150 155 160

Gly Gly Asn Gly Ala Trp Gln Gly Ala Ile Tyr Thr Leu Ile Tyr Thr
 165 170 175

Leu Gly Met Ala Leu Pro Phe Leu Val Leu Ala Leu Ala Ser Gly Leu
 180 185 190

Val Met Pro Tyr Phe Ser Lys Ile Lys Arg His Met Met Leu Leu Lys
 195 200 205

Lys Ile Gly Gly Phe Leu Ile Val Leu Met Gly Ile Leu Leu Leu Leu
 210 215 220

Gly Gln Val Asn Val Leu Ala Gly Ile Phe Glu
 225 230 235

<210> 300
 <211> 311
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 300

Met Val Lys Glu Leu Phe Met Lys Lys Gln Asn Leu Phe Leu Val Leu
 1 5 10 15

Leu Ser Val Phe Leu Leu Cys Leu Gly Ala Cys Gly Gln Lys Glu Ser
 20 25 30

Gln Thr Gly Lys Gly Met Lys Ile Val Thr Ser Phe Tyr Pro Ile Tyr
 35 40 45

Ala Met Val Lys Glu Val Ser Gly Asp Leu Asn Asp Val Arg Met Ile
 50 55 60

Gln Ser Ser Ser Gly Ile His Ser Phe Glu Pro Ser Ala Asn Asp Ile
 65 70 75 80

Ala Ala Ile Tyr Asp Ala Asp Val Phe Val Tyr His Ser His Thr Leu
 85 90 95

Glu Ser Trp Ala Gly Ser Leu Asp Pro Asn Leu Lys Lys Ser Lys Val
 100 105 110

Lys Val Leu Glu Ala Ser Glu Gly Met Thr Leu Glu Arg Val Pro Gly
 115 120 125

Leu Glu Asp Val Glu Ala Gly Asp Gly Val Asp Glu Lys Thr Leu Tyr
 130 135 140

Asp Pro His Thr Trp Leu Asp Pro Glu Lys Ala Gly Glu Glu Ala Gln
 145 150 155 160

Ile Ile Ala Asp Lys Leu Ser Glu Val Asp Ser Glu His Lys Glu Thr
 165 170 175

Tyr Gln Lys Asn Ala Gln Ala Phe Ile Lys Lys Ala Gln Glu Leu Thr
 180 185 190

Lys Lys Phe Gln Pro Lys Phe Glu Lys Ala Thr Gln Lys Thr Phe Val
 195 200 205

Thr Gln His Thr Ala Phe Ser Tyr Leu Ala Lys Arg Phe Gly Leu Asn
 210 215 220

Gln Leu Gly Ile Ala Gly Ile Ser Pro Glu Gln Glu Pro Ser Pro Arg
 225 230 235 240

Gln Leu Thr Glu Ile Gln Glu Phe Val Lys Thr Tyr Lys Val Lys Thr
 245 250 255

Ile Phe Thr Glu Ser Asn Ala Ser Ser Lys Val Ala Glu Thr Leu Val
 260 265 270

Lys Ser Thr Gly Val Gly Leu Lys Thr Leu Asn Pro Leu Glu Ser Asp
 275 280 285

Pro Gln Asn Asp Lys Thr Tyr Leu Glu Asn Leu Glu Glu Asn Met Ser
 290 295 300

Ile Leu Ala Glu Glu Leu Lys
 305 310

<210> 301

<211> 125

<212> PRT

<213> Streptococcus pneumoniae

<400> 301

Met Leu Lys Asn Leu Lys Ser Phe Leu Leu Arg Gly Asn Val Ile Asp
 1 5 10 15

Leu Ala Val Gly Val Val Ile Ala Ser Ala Phe Gly Ala Ile Val Thr
 20 25 30

Ser Leu Val Asn Asp Ile Ile Thr Pro Leu Ile Leu Asn Pro Ala Leu
 35 40 45

Lys Ala Ala Lys Val Glu Arg Ile Ala Gln Leu Ser Trp His Gly Val
 50 55 60

Gly Tyr Gly Asn Phe Leu Ser Ala Ile Ile Asn Phe Ile Phe Val Gly
 65 70 75 80

Thr Ala Leu Phe Phe Ile Ile Lys Gly Ile Glu Lys Ala Gln Lys Leu
 85 90 95

Thr Gly Ile Lys Glu Glu Lys Thr Asp Glu Lys Lys Pro Thr Glu Leu
 100 105 110

Glu Val Leu Gln Glu Ile Lys Ala Leu Leu Glu Lys Lys
 115 120 125

<210> 302

<211> 339

<212> PRT

<213> Streptococcus pneumoniae

<400> 302

Met His Ala Lys Met Arg Asn Lys Lys Gln Ile Asn Leu Gly Ile Ile
 1 5 10 15

Phe Ile Ile Cys Leu Gly Leu Leu Ile Thr Ile Phe Leu Ser Leu Lys
 20 25 30

Leu Gly Thr Lys Glu Ile Asn Ile Arg Asp Phe Leu Ala Ala Phe Gly
 35 40 45

Met Gly Asn Thr Asn Asp Asp Phe Ile Lys Ser Ile Ile Tyr Lys Arg
 50 55 60

Ile Pro Arg Thr Ile Phe Ala Ile Leu Ala Gly Ser Ser Leu Ala Ile
 65 70 75 80

Ser Gly Val Leu Met Gln Ser Val Thr Arg Asn Pro Ile Ala Asp Pro
 85 90 95

Gly Ile Leu Gly Ile Asn Thr Gly Ala Ser Leu Ser Val Val Ile Gly
 100 105 110

Leu Ser Phe Leu Gly Ile Ser Ser Ser Ile Ser His Ile Ser Phe Ala
 115 120 125

Ile Ile Gly Gly Leu Val Ser Ala Ile Phe Val Tyr Ala Ile Ala Val
 130 135 140

Ser Gly Lys Ala Gly Leu Thr Pro Ile Lys Leu Ala Leu Ser Gly Thr
 145 150 155 160

Cys Val Ser Met Ala Leu Ser Ser Phe Val Ser Phe Leu Ile Leu Pro
 165 170 175

Asn Asn Asn Val Leu Asp Lys Phe Arg Phe Trp Gln Ile Gly Ser Leu
 180 185 190

Gly Ala Ala Thr Leu Ser Ser Ile Ser Thr Leu Leu Pro Phe Ile Ile
 195 200 205

Leu Gly His Leu Ile Ala Ile Phe Ile Ser Ser Asp Leu Asn Ala Leu
 210 215 220

Ala Met Gly Asp Glu Met Ala Val Gly Leu Gly Val Asn Val Asn Arg
 225 230 235 240

Ile Arg Ser Leu Ala Ile Ile Ala Ser Val Leu Leu Cys Ser Ser Ile
 245 250 255

Thr Ala Ile Gly Gly Pro Ile Gly Phe Val Gly Leu Ile Val Pro His
 260 265 270

Phe Cys Gly Leu Phe Ile Ser Lys Asp Ile Arg Thr Met Thr Ile Ser
 275 280 285

Ser Ser Phe Ile Gly Ala Glu Leu Leu Leu Ile Cys Asp Ile Ile Gly
 290 295 300

Arg Met Leu Gly Lys Pro Gly Glu Ile Glu Val Gly Ile Ile Thr Ala
 305 310 315 320

Ile Ile Gly Gly Pro Val Leu Ile Tyr Val Thr Met Lys Asn Arg Gly
 325 330 335

Val Asn Asn

<210> 303
 <211> 335
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 303

Met Gln Asn Leu Ile Ile Gly Ile Gln Lys Arg Lys Asn Arg Ile Thr
 1 5 10 15

Leu Phe Ser Ser Leu Phe Leu Leu Ile Ile Ile Ser Leu Ser Phe Phe
 20 25 30

Ile Leu Leu Ile Gly Asp Glu Ser Tyr Ser Phe Ser Thr Leu Ile Lys
 35 40 45

Val Leu Asn Ser Glu Thr Val Pro Gly Ala Ser Phe Ser Ile Met Glu
 50 55 60

Ile Arg Leu Pro Lys Leu Leu Ala Gly Ile Ile Ala Gly Trp Ser Phe
 65 70 75 80

Gly Leu Ala Gly Phe Ile Phe Gln Thr Met Leu Arg Asn Pro Leu Ala
 85 90 95

Ser Pro Asp Ile Ile Gly Val Thr Ser Ser Ser Ser Ile Ala Ala Val
 100 105 110

Phe Cys Ile Leu Val Leu Lys Thr Asn Ser Leu Thr Thr Gly Ile Ile
 115 120 125

Ser Ile Thr Cys Gly Leu Thr Ser Ser Leu Ile Leu Phe Leu Leu Ala
 130 135 140

Lys Lys Asp Gly Phe Ser Ala Ala Arg Leu Ile Ile Leu Gly Ile Gly
 145 150 155 160

Phe Gln Ala Val Thr Arg Ala Gly Thr Ser Phe Leu Leu Leu Lys Val
 165 170 175

Ala Arg Tyr Glu Leu Gln Glu Val Met Arg Trp Leu Ser Gly Ser Leu
 180 185 190

Ser Phe Thr Lys Leu Asp Asp Ile Pro Leu Val Leu Ile Val Ser Ile
 195 200 205

Ile Ala Thr Ile Leu Val Leu Phe Phe Asn Lys Arg Leu Glu Ile Ile
 210 215 220

Glu Leu Gly Glu Glu Ile Ala Ile Gly Leu Gly Ala Asn Pro Glu Leu
 225 230 235 240

Ser Arg Leu Val Leu Ile Phe Cys Ala Val Ser Leu Thr Ala Phe Ser
 245 250 255

Thr Ser Ile Thr Gly Pro Ile Ala Cys Ile Ser Phe Leu Ala Gly Pro
 260 265 270

Ile Ala Leu Asn Ile Gly Lys Lys Arg Ser Pro Ile Leu Ala Gly Leu
 275 280 285

Val Gly Ile Leu Leu Val Leu Leu Ser Asp Ile Phe Ser Gln Asn Ile
 290 295 300

Leu Pro Ala Arg Tyr Pro Val Gly Val Val Thr Gly Leu Leu Gly Ser
 305 310 315 320

Pro Tyr Leu Ile Tyr Leu Leu Ile Lys Met Asn Arg Arg Asn Ile
 325 330 335

<210> 304

<211> 305

<212> PRT

<213> Streptococcus pneumoniae

<400> 304

Met Asn Cys Phe Leu Lys Met Asn Asn Val Ser Val Arg Tyr Asp Asp
 1 5 10 15
 Val Ile Ala Leu Lys Asp Ile Thr Leu Gln Ile Asn Lys Gly Asp Phe
 20 25 30
 Ile Gly Leu Leu Gly Ser Asn Gly Ala Gly Lys Ser Thr Leu Ile Asn
 35 40 45
 Ser Ile Val Gly Phe Gln Glu Ile Tyr Leu Gly Glu Ile Glu Tyr Cys
 50 55 60
 Asp Lys Asp Leu Ile Val Ser Ser Gln Pro Phe Ala His Leu Gly Phe
 65 70 75 80
 Thr Pro Gln Thr Thr Val Ile Asp Phe Tyr Thr Thr Val Lys Asp Asn
 85 90 95
 Val Ile Leu Gly Leu Asn Leu Ala Gly Lys Phe Gly Lys Asn Ala Glu
 100 105 110
 Lys Leu Cys Gln Ile Ala Leu Glu Ile Val Gly Leu Ala Asp Lys Lys
 115 120 125
 Asn Asn Leu Val Glu Thr Leu Ser Gly Gly Gln Leu Gln Arg Val Gln
 130 135 140
 Ile Ala Arg Ala Ile Ala His Asn Pro Asp Phe Tyr Ile Leu Asp Glu
 145 150 155 160
 Pro Thr Val Gly Leu Asp Thr Glu Ser Ala Glu Lys Phe Leu Met Tyr
 165 170 175
 Leu Lys Asp Lys Ser Leu Glu Gly Lys Thr Ile Ile Ile Ser Ser His
 180 185 190
 Asp Ile Asn Leu Leu Glu Lys Phe Cys Lys Lys Ile Leu Phe Leu Gln
 195 200 205
 Asn Gly Ser Ile Ser Phe Phe Gly Asp Met Arg Asp Phe Val Asp Asn
 210 215 220

Ser Thr Ile Lys Leu Asn Phe Ser Met Gln Asn Arg Ile Ser Arg Tyr
 225 230 235 240

Gln Ile Glu Phe Leu Glu Asn Phe Arg Phe Lys Val His Ile Glu Asp
 245 250 255

Asn Asp Ser Phe Thr Ile Glu Val Pro Ile Glu Glu Lys Ile Leu Asp
 260 265 270

Val Ile Asn Glu Val Gly Lys Ala Cys Glu Ile Lys Asn Phe Ser Thr
 275 280 285

Ser Lys Leu Thr Leu Gln Glu Ser Tyr Leu Gln Arg Ile Gly Gly Glu
 290 295 300

Lys
 305

<210> 305
 <211> 266
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 305

Met Lys Ala Asp Gln Leu Arg His Lys Ser Asp Leu Gly Leu Arg Gly
 1 5 10 15

Leu Ala Ile Ile Ala Lys Asn Glu Ile Ile Ala Phe Phe Arg Ser Lys
 20 25 30

Gly Leu Ile Ile Ser Gln Phe Leu Gln Pro Ile Leu Tyr Val Val Phe
 35 40 45

Ile Ile Ile Gly Leu Asn Ser Ser Ile Lys Asn Ile Gln Phe Asn Asp
 50 55 60

Ile Lys Thr Ser Tyr Ala Glu Tyr Thr Ile Ile Gly Val Ile Ala Leu
 65 70 75 80

Leu Ile Ile Gly Gln Met Thr Gln Val Ile Tyr Arg Val Thr Ile Asp
 85 90 95

Lys Lys Tyr Gly Leu Leu Ala Leu Lys Leu Cys Ser Gly Val Arg Pro
 100 105 110

Leu Tyr Tyr Ile Leu Gly Met Ser Ile Tyr Ser Ile Leu Gly Leu Ile
 115 120 125

Val Gln Glu Ile Ile Ile Tyr Ile Ile Thr Leu Ala Phe Glu Ile Asn
 130 135 140

Ile Ala Met Asp Arg Phe Phe Tyr Thr Val Leu Leu Ser Ile Val Val
 145 150 155 160

Leu Leu Phe Trp Asp Ser Leu Ala Ile Leu Leu Thr Met Phe Ile Asn
 165 170 175

Asp Tyr Arg Arg Arg Asp Ile Val Ile Arg Phe Val Leu Thr Pro Leu
 180 185 190

Gly Phe Thr Ala Pro Val Phe Tyr Leu Ile Asp Ser Ala Pro Ser Ile
 195 200 205

Val Arg Trp Ile Gly Gln Leu Asn Pro Leu Thr Tyr Gln Leu Thr Ile
 210 215 220

Leu Arg Asn Phe Tyr Phe Lys Asn Ser Thr Thr Leu Glu Leu Val Phe
 225 230 235 240

Leu Leu Leu Thr Ser Leu Leu Val Leu Ile Ser Val Ser Phe Ile Ile
 245 250 255

Pro Lys Ile Lys Leu Ile Leu Ile Glu Arg
 260 265

<210> 306
 <211> 344
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 306

Met Leu Lys Glu Ile Lys Arg Arg Asn Arg Met Lys Asn Lys Arg Leu
 1 5 10 15

Ile Gly Ile Ile Ala Ala Leu Ala Val Leu Val Ala Gly Ser Leu Ile
 20 25 30

Tyr Ser Ser Met Asn Lys Ser Glu Ala Gln Asn Asn Lys Asp Glu Lys
 35 40 45

Lys Ile Thr Lys Ile Gly Val Leu Gln Phe Val Ser His Pro Ser Leu
 50 55 60

Asp Leu Ile Tyr Lys Gly Ile Gln Asp Gly Leu Ala Glu Glu Gly Tyr
 65 70 75 80

Lys Asp Asp Gln Val Lys Ile Asp Phe Met Asn Ser Glu Gly Asp Gln
 85 90 95

Ser Lys Val Ala Thr Met Ser Lys Gln Leu Val Ala Asn Gly Asn Asp
 100 105 110

Leu Val Val Gly Ile Ala Thr Pro Ala Ala Gln Gly Leu Ala Ser Ala
 115 120 125

Thr Lys Asp Leu Pro Val Ile Met Ala Ala Ile Thr Asp Pro Ile Gly
 130 135 140

Ala Asn Leu Val Lys Asp Leu Lys Lys Pro Gly Gly Asn Val Thr Gly
 145 150 155 160

Val Ser Asp His Asn Pro Ala Gln Gln Gln Val Glu Leu Ile Lys Ala
 165 170 175

Leu Thr Pro Asn Val Lys Thr Ile Gly Ala Leu Tyr Ser Ser Glu
 180 185 190

Asp Asn Ser Lys Thr Gln Val Glu Glu Phe Lys Ala Tyr Ala Glu Lys
 195 200 205

Ala Gly Leu Thr Val Glu Thr Phe Ala Val Pro Ser Thr Asn Glu Ile
 210 215 220

Ala Ser Thr Val Thr Val Met Thr Ser Lys Val Asp Ala Ile Trp Val

225 230 235 240

Pro Ile Asp Asn Thr Ile Ala Ser Gly Phe Pro Thr Val Val Ser Ser
 245 250 255

Asn Gln Ser Ser Lys Lys Pro Ile Tyr Pro Ser Ala Thr Ala Met Val
 260 265 270

Glu Val Gly Gly Leu Ala Ser Val Val Ile Asp Gln His Asp Leu Gly
 275 280 285

Val Ala Thr Gly Lys Met Ile Val Gln Val Leu Lys Gly Ala Lys Pro
 290 295 300

Ala Asp Thr Pro Val Asn Val Phe Ser Thr Gly Lys Ser Val Ile Asn
305 310 315 320

Lys Lys Ile Ala Gln Glu Leu Gly Ile Thr Ile Pro Glu Ser Val Leu
 325 330 335

Lys Glu Ala Gly Gln Val Ile Glu
 340

<210> 307
<211> 252
<212> PRT
<213> Streptococcus pneumoniae

<400> 307

Met Thr Ala Ile Val Glu Leu Lys Asn Ala Thr Lys Ile Val Lys Asn
1 5 10 15

Gly Phe Asp Glu Glu Lys Ile Ile Leu Asn Asp Val Ser Leu Glu Ile
 20 25 30

Phe Glu Arg Asp Phe Ile Thr Ile Leu Gly Gly Asn Gly Ala Gly Lys
 35 40 45

Ser Thr Leu Phe Asn Thr Ile Ala Gly Thr Leu Ser Leu Thr Ser Gly
50 55 60

Thr Ile Arg Ile Leu Gly Glu Asp Leu Thr Lys Phe Ser Pro Glu Lys

65		70		75		80
Arg Ala Lys Tyr	Leu Ser Arg Val Phe	Gln Asp Pro Lys Met	Gly Thr			
	85		90		95	
Ala Pro Arg Met Thr Val Ala Glu Asn Leu Leu Ile Ala Lys Phe Arg						
	100		105		110	
Gly Glu Lys Arg Gly Leu Leu Pro Arg Arg Leu Thr Ser Tyr Lys Asp						
	115		120		125	
Glu Phe Gln Ala Thr Ile Glu Lys Val Gly Asn Gly Leu Glu Lys His						
	130		135		140	
Leu Asn Thr Pro Ile Glu Phe Leu Ser Gly Gly Gln Arg Gln Ala Leu						
	145		150		155	160
Ser Leu Leu Met Ala Thr Leu Lys Arg Pro Glu Leu Leu Leu Leu Asp						
	165		170		175	
Glu His Thr Ala Ala Leu Asp Pro Lys Thr Ser Val Ala Leu Met Glu						
	180		185		190	
Leu Thr Asp Glu Phe Val Lys Lys Asp Gln Leu Thr Ala Leu Met Ile						
	195		200		205	
Thr His His Met Glu Asp Ala Leu Lys Tyr Gly Asn Arg Leu Ile Val						
	210		215		220	
Met Lys Glu Gly Arg Ile Ile Gln Asp Leu Asn Gln Glu Glu Lys Ala						
	225		230		235	240
Lys Met Lys Ile Ser Asp Tyr Tyr Gln Leu Phe Glu						
	245		250			
<210> 308						
<211> 234						
<212> PRT						
<213> Streptococcus pneumoniae						
<400> 308						
Met Gly Gly Lys Met Arg Leu Leu Pro Ile Arg Lys Ile Ser Arg Gln						

1	5	10	15
Ser Lys Arg	Leu Ala Leu Phe Leu Thr	Phe Cys Ala Gly Tyr	Val Asp
	20	25	30
Ala Tyr Thr	Phe Ile Val Arg Gly Asn Thr	Leu Val Ala Gly Gln Thr	
	35	40	45
Gly Asn Val Val Phe Leu Ser Val	Glu Leu Ile Lys Asn Asn Val Ser		
	50	55	60
Asp Val Arg Asp Lys Val Leu Thr Leu Leu Ala Phe Met Met Gly Val			
65	70	75	80
Phe Leu Leu Thr Ile Tyr Lys Glu Lys Leu Arg Ile Val Lys Lys Pro			
	85	90	95
Ile Leu Ser Leu Ile Pro Leu Ala Ile Leu Ser Ile Ile Ile Ala Phe			
	100	105	110
Val Pro Gln Thr Val Asp Asn Ile Tyr Leu Val Pro Pro Leu Ala Phe			
	115	120	125
Cys Met Gly Leu Val Thr Thr Ala Phe Gly Glu Val Ser Gly Ile Ala			
	130	135	140
Tyr Asn Asn Ala Phe Met Thr Gly Asn Ile Lys Arg Thr Met Leu Ala			
145	150	155	160
Phe Gly Asp Tyr Phe Arg Thr Lys His Thr Pro Phe Leu Arg Glu Gly			
	165	170	175
Phe Ile Phe Val Ser Leu Leu Ser Ser Phe Val Leu Gly Val Val Phe			
	180	185	190
Ser Ala Tyr Leu Thr Ile Phe Tyr His Glu Lys Thr Ile Leu Gly Val			
	195	200	205
Pro Ile Met Met Ser Val Phe Tyr Leu Ser Met Leu Phe Ala Ser Trp			
	210	215	220

Gln Lys Lys Val Lys Glu Lys Ala Ser Phe
 225 230

<210> 309

<211> 282

<212> PRT

<213> Streptococcus pneumoniae

<400> 309

Met Ile Lys Lys Ile Tyr Pro Ile Phe Thr Ile Leu Leu Gly Ala Ala
 1 5 10 15

Ile Tyr Ala Phe Gly Leu Thr Tyr Phe Val Val Pro His His Leu Phe
 20 25 30

Glu Gly Gly Ala Thr Gly Ile Thr Leu Ile Thr Phe Tyr Leu Phe Lys
 35 40 45

Ile Pro Val Ser Leu Met Asn Leu Leu Ile Asn Ile Pro Leu Phe Ile
 50 55 60

Leu Ala Trp Lys Ile Phe Gly Ala Lys Ser Leu Tyr Ser Ser Leu Leu
 65 70 75 80

Gly Thr Leu Ala Leu Ser Gly Trp Leu Ala Phe Phe Glu His Ile Pro
 85 90 95

Leu His Ile Asp Leu Gln Gly Asp Leu Leu Ile Thr Ala Leu Ile Ala
 100 105 110

Gly Ile Leu Leu Gly Ile Gly Leu Gly Ile Ile Phe Asn Ala Gly Gly
 115 120 125

Thr Thr Gly Gly Thr Asp Ile Leu Ala Arg Ile Leu Asn Lys Tyr Thr
 130 135 140

His Ile Ser Ile Gly Lys Leu Leu Phe Ile Leu Asp Phe Cys Ile Leu
 145 150 155 160

Met Leu Ile Leu Leu Ile Phe Lys Asp Leu Arg Leu Val Ser Tyr Thr
 165 170 175

Leu Leu Phe Asp Phe Ile Val Ser Arg Val Ile Asp Leu Ile Gly Glu
 180 185 190

Gly Gly Tyr Ala Gly Lys Gly Phe Met Ile Ile Thr Lys Arg Pro Asp
 195 200 205

Gln Leu Ala Lys Ala Ile Asn Asp Asp Leu Gly Arg Gly Val Thr Phe
 210 215 220

Ile Ser Gly Gln Gly Tyr Tyr Ser Lys Glu Asn Leu Lys Ile Ile Tyr
 225 230 235 240

Cys Ile Val Gly Arg Asn Glu Ile Val Lys Thr Lys Glu Met Ile His
 245 250 255

Arg Ile Asp Pro Gln Ala Phe Ile Thr Ile Thr Glu Ala His Glu Ile
 260 265 270

Leu Gly Glu Gly Phe Thr Phe Glu Lys Glu
 275 280

<210> 310

<211> 91

<212> PRT

<213> Streptococcus pneumoniae

<400> 310

Met Ala Asn Lys Gln Asp Leu Ile Ala Lys Val Ala Glu Ala Thr Glu
 1 5 10 15

Leu Thr Lys Lys Asp Ser Ala Ala Ala Val Glu Ala Val Phe Ala Ala
 20 25 30

Val Ala Asp Tyr Leu Ala Ala Gly Glu Lys Val Gln Leu Ile Gly Phe
 35 40 45

Gly Asn Phe Glu Val Arg Glu Arg Ala Glu Arg Lys Gly Arg Asn Pro
 50 55 60

Gln Thr Gly Lys Glu Met Thr Ile Ala Ala Ser Lys Val Pro Ala Phe
 65 70 75 80

Lys Ala Gly Lys Ala Leu Lys Asp Ala Val Lys
85 90

<210> 311

<211> 356

<212> PRT

<213> Streptococcus pneumoniae

<400> 311

Met Lys Arg Glu Ile Leu Leu Glu Arg Ile Asp Lys Leu Lys Gln Leu
1 5 10 15

Met Pro Trp Tyr Val Leu Glu Tyr Tyr Gln Ser Lys Leu Ala Val Pro
20 25 30

Tyr Ser Phe Thr Thr Leu Tyr Glu Tyr Leu Lys Glu Tyr Asp Arg Phe
35 40 45

Phe Ser Trp Val Leu Glu Ser Gly Ile Ser Asn Ala Asp Lys Ile Ser
50 55 60

Asp Ile Pro Leu Ser Val Leu Glu Asn Met Ser Lys Lys Asp Met Glu
65 70 75 80

Ser Phe Ile Leu Tyr Leu Arg Glu Arg Pro Leu Leu Asn Ala Asn Thr
85 90 95

Thr Lys Gln Gly Val Ser Gln Thr Thr Ile Asn Arg Thr Leu Ser Ala
100 105 110

Leu Ser Ser Leu Tyr Lys Tyr Leu Thr Glu Glu Val Glu Asn Asp Gln
115 120 125

Gly Glu Pro Tyr Phe Tyr Arg Asn Val Met Lys Lys Val Ser Thr Lys
130 135 140

Lys Lys Lys Glu Thr Leu Ala Ala Arg Ala Glu Asn Ile Lys Gln Lys
145 150 155 160

Leu Phe Leu Gly Asp Glu Thr Glu Gly Phe Leu Thr Tyr Ile Asp Gln
165 170 175

Glu His Pro Gln Gln Leu Ser Asn Arg Ala Leu Ser Ser Phe Asn Lys
 180 185 190

Asn Lys Glu Arg Asp Leu Ala Ile Ile Ala Leu Leu Leu Ala Ser Gly
 195 200 205

Val Arg Leu Ser Glu Ala Val Asn Leu Asp Leu Arg Asp Leu Asn Leu
 210 215 220

Lys Met Met Val Ile Asp Val Thr Arg Lys Gly Cys Lys Arg Asp Ser
 225 230 235 240

Val Asn Val Ala Ala Phe Ala Lys Pro Tyr Leu Glu Asn Tyr Leu Ala
 245 250 255

Ile Arg Asn Gln Arg Tyr Lys Thr Glu Lys Thr Asp Thr Ala Leu Phe
 260 265 270

Leu Thr Leu Tyr Arg Gly Val Pro Asn Arg Ile Asp Ala Ser Ser Val
 275 280 285

Glu Lys Met Val Ala Lys Tyr Ser Glu Asp Phe Lys Val Arg Val Thr
 290 295 300

Pro His Lys Leu Arg His Thr Leu Ala Thr Arg Leu Tyr Asp Ala Thr
 305 310 315 320

Lys Ser Gln Val Leu Val Ser His Gln Leu Gly His Ala Ser Thr Gln
 325 330 335

Val Thr Asp Leu Tyr Thr His Ile Val Ser Asp Glu Gln Lys Asn Ala
 340 345 350

Leu Asp Ser Leu
 355

<210> 312
 <211> 118
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 312

Met Ala Pro Arg Phe Pro Ala Ser Arg Ser Ala Ile Cys Ile Asp Pro
 1 5 10 15

Pro Phe Pro Leu Gln Val Pro Val Tyr Leu Pro Arg Ile Ser Ala Ile
 20 25 30

Ile Pro Leu Arg Ser Ile Pro Leu Ala Ile Ala Cys Pro Cys Pro Arg
 35 40 45

Trp Phe Glu Val Ile Arg Ser Ser Gly Leu Arg Ala Asn Ile Ala Pro
 50 55 60

Thr Leu Ala Ala Ser Ser Pro Thr Glu Lys Cys Val Ile Pro Gly Thr
 65 70 75 80

Phe Pro Phe Phe Thr Asn Cys Ala Ile Phe Lys Ser Met Arg Arg Ile
 85 90 95

Ser Ser Ile Leu Arg Asn Ile Ser Ser Lys Arg Phe Leu Ser Lys Val
 100 105 110

Asp Ile Phe Leu Pro Phe
 115

<210> 313
 <211> 563
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 313

Met Asn Lys Leu Ile Ala Phe Ile Glu Lys Gly Lys Pro Phe Phe Glu
 1 5 10 15

Lys Leu Ser Arg Asn Ile Tyr Leu Arg Ala Ile Arg Asp Gly Phe Ile
 20 25 30

Ala Gly Met Pro Val Ile Leu Phe Ser Ser Ile Phe Ile Leu Ile Ala
 35 40 45

Phe Val Pro Asn Ser Trp Gly Phe Lys Trp Ser Asp Glu Val Val Ala
 50 55 60

Phe Leu Met Lys Pro Tyr Ser Tyr Ser Met Gly Ile Leu Ala Leu Leu
 65 70 75 80

Val Ala Gly Thr Thr Ala Lys Ser Leu Thr Asp Ser Val Asn Arg Ser
 85 90 95

Met Glu Lys Thr Asn Gln Ile Lys Tyr Met Ser Thr Leu Leu Ala Ala
 100 105 110

Ile Val Gly Leu Leu Met Leu Ala Ala Asp Pro Ile Glu Ser Gly Leu
 115 120 125

Ala Thr Gly Phe Leu Gly Thr Lys Gly Leu Leu Ser Ala Phe Leu Ala
 130 135 140

Ala Phe Val Thr Val Ala Ile Tyr Lys Val Cys Val Lys Asn Asn Val
 145 150 155 160

Thr Ile Arg Met Pro Asp Glu Val Pro Pro Asn Ile Ser Gln Val Phe
 165 170 175

Lys Asp Val Ile Pro Phe Thr Leu Ser Val Val Ser Leu Tyr Ala Leu
 180 185 190

Asp Leu Leu Ala Arg Tyr Phe Val Gly Ser Ser Val Ala Glu Ser Ile
 195 200 205

Gly Lys Phe Phe Ala Pro Leu Phe Ser Ala Ala Asp Gly Tyr Leu Gly
 210 215 220

Ile Thr Ile Ile Phe Gly Ala Phe Ala Phe Phe Trp Phe Val Gly Ile
 225 230 235 240

His Gly Pro Ser Ile Val Glu Pro Ala Ile Ala Ala Ile Thr Tyr Ala
 245 250 255

Asn Ala Glu Val Asn Leu Asn Leu Leu Gln Gln Gly Met His Ala Asp
 260 265 270

Lys Ile Leu Thr Ser Gly Thr Gln Met Phe Ile Val Thr Met Gly Gly
 275 280 285

Thr Gly Ala Thr Leu Val Val Pro Phe Met Phe Met Trp Leu Thr Lys
 290 295 300
 Ser Lys Arg Asn Arg Ala Ile Gly Arg Ala Ser Val Val Pro Thr Phe
 305 310 315 320
 Phe Gly Val Asn Glu Pro Ile Leu Phe Gly Ala Pro Leu Val Leu Asn
 325 330 335
 Pro Ile Phe Phe Ile Pro Phe Ile Phe Ala Pro Ile Ala Asn Val Trp
 340 345 350
 Ile Phe Lys Phe Phe Ile Glu Thr Leu Gly Met Asn Ser Phe Thr Ala
 355 360 365
 Asn Leu Pro Trp Thr Thr Pro Ala Pro Leu Gly Leu Val Leu Gly Thr
 370 375 380
 Asn Phe Gln Val Leu Ser Phe Ile Leu Ala Ala Leu Leu Ile Val Val
 385 390 395 400
 Asp Val Val Ile Tyr Tyr Pro Phe Leu Lys Val Tyr Asp Glu Gln Ile
 405 410 415
 Leu Glu Glu Glu Arg Ser Gly Lys Ser Asn Asp Glu Leu Lys Glu Lys
 420 425 430
 Val Ala Ala Asn Phe Asn Thr Ala Lys Ala Asp Ala Ile Leu Glu Lys
 435 440 445
 Ala Gly Val Asp Ala Ala Gln Asn Thr Ile Thr Glu Glu Thr Asn Val
 450 455 460
 Leu Val Leu Cys Ala Gly Gly Gly Thr Ser Gly Leu Leu Ala Asn Ala
 465 470 475 480
 Leu Asn Lys Ala Ala Ala Glu Tyr Asn Val Pro Val Lys Ala Ala Ala
 485 490 495
 Gly Gly Tyr Gly Ala His Arg Glu Met Leu Pro Glu Phe Asp Leu Val
 500 505 510

Ile Leu Ala Pro Gln Val Ala Ser Asn Phe Glu Asp Met Lys Ala Glu
 515 520 525

Thr Asp Lys Leu Gly Ile Lys Leu Ala Lys Thr Glu Gly Ala Gln Tyr
 530 535 540

Ile Lys Leu Thr Arg Asp Gly Lys Gly Ala Leu Ala Phe Val Gln Ala
 545 550 555 560

Gln Phe Asp

<210> 314

<211> 265

<212> PRT

<213> Streptococcus pneumoniae

<400> 314

Met Val Ser Ser Glu Phe Ile Ser Lys Ile Glu Phe Ala Cys Asn Lys
 1 5 10 15

Lys Glu Ser Leu Tyr Ser Gln Ser Lys Phe Lys Tyr Ala Ile Arg Ser
 20 25 30

Met Phe Ala Gly Ala Phe Leu Thr Phe Ser Thr Ala Ala Gly Ala Val
 35 40 45

Gly Ala Asp Leu Ile Asn Lys Ile Ala Pro Gly Ser Gly Arg Phe Leu
 50 55 60

Phe Pro Phe Val Phe Ala Trp Gly Leu Ala Tyr Ile Val Phe Leu Asn
 65 70 75 80

Ala Glu Leu Val Thr Ser Asn Met Met Phe Leu Thr Ala Gly Ser Phe
 85 90 95

Leu Lys Lys Ile Ser Trp Arg Lys Thr Ala Glu Ile Leu Leu Tyr Cys
 100 105 110

Thr Leu Phe Asn Leu Ile Gly Ala Leu Ile Ala Gly Trp Gly Phe Ala
 115 120 125

His Ser Ala Ala Tyr Ala Asn Leu Thr His Asp Ser Phe Ile Ser Gly
 130 135 140

Val Val Glu Met Lys Leu Gly Arg Ser Asn Glu Leu Val Leu Leu Glu
 145 150 155 160

Ala Ile Leu Ala Asn Ile Phe Val Asn Ile Ala Ile Leu Ser Phe Ile
 165 170 175

Leu Val Lys Asp Gly Gly Ala Lys Leu Trp Leu Val Leu Ser Ala Ile
 180 185 190

Tyr Met Phe Val Phe Leu Thr Asn Glu His Ile Ala Ala Asn Phe Ala
 195 200 205

Ser Phe Ala Ile Val Lys Phe Ser Val Ala Ala Asp Ser Ile Ala Asn
 210 215 220

Phe Gly Val Gly Asn Met Leu Arg His Trp Gly Val Thr Phe Ile Gly
 225 230 235 240

Asn Phe Ile Gly Gly Gly Leu Leu Met Gly Leu Pro Tyr Ala Phe Leu
 245 250 255

Asn Lys Asn Glu Asp Thr Tyr Val Asp
 260 265

<210> 315

<211> 449

<212> PRT

<213> Streptococcus pneumoniae

<400> 315

Met Leu Asp Leu Leu Lys Gln Thr Ile Phe Thr Arg Asp Phe Ile Phe
 1 5 10 15

Ile Leu Ile Leu Leu Gly Phe Ile Leu Val Val Thr Leu Leu Leu
 20 25 30

Glu Asn Arg Arg Asp Asn Ile Gln Leu Lys Gln Val Asn Gln Lys Val
 35 40 45

Lys Asp Leu Ile Ala Gly Asp Tyr Ser Lys Val Leu Asp Met Gln Gly
 50 55 60

Gly Ser Glu Ile Thr Asn Ile Thr Asn Asn Leu Asn Asp Leu Ser Glu
 65 70 75 80

Val Ile Arg Leu Thr Gln Glu Asn Leu Glu Gln Glu Ser Lys Arg Leu
 85 90 95

Asn Ser Ile Leu Phe Tyr Met Thr Asp Gly Val Leu Ala Thr Asn Arg
 100 105 110

Arg Gly Gln Ile Ile Met Ile Asn Asp Thr Ala Lys Lys Gln Leu Gly
 115 120 125

Leu Val Lys Glu Asp Val Leu Asn Arg Ser Ile Leu Glu Leu Leu Lys
 130 135 140

Ile Glu Glu Asn Tyr Glu Leu Arg Asp Leu Ile Thr Gln Ser Pro Glu
 145 150 155 160

Leu Leu Leu Asp Ser Gln Asp Ile Asn Gly Glu Tyr Leu Asn Leu Arg
 165 170 175

Val Arg Phe Ala Leu Ile Arg Arg Glu Ser Gly Phe Ile Ser Gly Leu
 180 185 190

Val Ala Val Leu His Asp Thr Thr Glu Gln Glu Lys Glu Glu Arg Glu
 195 200 205

Arg Arg Leu Phe Val Ser Asn Val Ser His Glu Leu Arg Thr Pro Leu
 210 215 220

Thr Ser Val Lys Ser Tyr Leu Glu Ala Leu Asp Glu Gly Ala Leu Cys
 225 230 235 240

Glu Thr Val Ala Pro Asp Phe Ile Lys Val Ser Leu Asp Glu Thr Asn
 245 250 255

Arg Met Met Arg Met Val Thr Asp Leu Leu His Leu Ser Arg Ile Asp

260	265	270
Asn Ala Thr Ser His Leu Asp Val Glu Leu Ile Asn Phe Thr Ala Phe		
275	280	285
Ile Thr Phe Ile Leu Asn Arg Phe Asp Lys Met Lys Gly Gln Glu Lys		
290	295	300
Glu Lys Lys Tyr Glu Leu Val Arg Asp Tyr Pro Ile Asn Ser Ile Trp		
305	310	315
Met Glu Ile Asp Thr Asp Lys Met Thr Gln Val Val Asp Asn Ile Leu		
325	330	335
Asn Asn Ala Ile Lys Tyr Ser Pro Asp Gly Gly Lys Ile Thr Val Arg		
340	345	350
Met Lys Thr Thr Glu Asp Gln Met Ile Leu Ser Ile Ser Asp His Gly		
355	360	365
Leu Gly Ile Pro Lys Gln Asp Leu Pro Arg Ile Phe Asp Arg Phe Tyr		
370	375	380
Arg Val Asp Arg Ala Arg Ser Arg Ala Gln Gly Gly Thr Gly Leu Gly		
385	390	395
Leu Ser Ile Ala Lys Glu Ile Ile Lys Gln His Lys Gly Phe Ile Trp		
405	410	415
Ala Lys Ser Glu Tyr Gly Lys Gly Ser Thr Phe Thr Ile Val Leu Pro		
420	425	430
Tyr Asp Lys Asp Ala Val Lys Glu Glu Val Trp Glu Asp Glu Val Glu		
435	440	445

Asp

<210> 316

<211> 193

<212> PRT

<213> Streptococcus pneumoniae

<400> 316

Met Ser Gly Leu Leu Tyr His Thr Ser Val Tyr Ala Val Lys Lys Glu
 1 5 10 15

Ile Leu Val Asn Thr Arg Lys Lys Thr Gln Phe Met Thr Met Thr Ala
 20 25 30

Leu Leu Thr Ala Ile Ala Ile Leu Ile Pro Ile Val Met Pro Phe Lys
 35 40 45

Ile Val Ile Pro Pro Ala Ser Tyr Thr Leu Gly Ser His Ile Ala Ile
 50 55 60

Phe Ile Ala Met Phe Leu Ser Pro Leu Met Ala Val Phe Val Ile Leu
 65 70 75 80

Ala Ser Ser Phe Gly Phe Leu Met Ala Gly Tyr Pro Met Val Ile Val
 85 90 95

Phe Arg Ala Phe Ser His Ile Ser Phe Gly Ala Leu Gly Ala Leu Tyr
 100 105 110

Leu Gln Lys Phe Pro Asp Thr Leu Asp Lys Pro Lys Ser Ser Trp Ile
 115 120 125

Phe Asn Phe Val Leu Ala Val Val His Ala Leu Ala Glu Val Leu Ala
 130 135 140

Cys Val Val Phe Tyr Ala Thr Ser Gly Thr Asn Val Glu Asn Met Phe
 145 150 155 160

Tyr Val Leu Phe Val Leu Val Gly Phe Gly Thr Ile Ile His Ser Met
 165 170 175

Val Asp Tyr Thr Leu Ala Leu Ala Val Tyr Lys Val Leu Arg Lys Arg
 180 185 190

Arg

<210> 317
 <211> 269
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 317

Met Lys Asn Lys Arg Ile Phe Lys Asp Phe Gln Ala Ser Lys Met Ser
 1 5 10 15

Leu Asn Ile Tyr Thr Ser Pro Leu Leu Ala Phe Val Phe Val Phe Ile
 20 25 30

Gly Glu Phe Val Ala Phe Thr Leu Tyr Gly Ile Gly Leu Leu Ala Leu
 35 40 45

Ile Gly Leu Ala Arg Asn Phe Gly Glu Ala Gly Gln Asn Leu Ala Ser
 50 55 60

Tyr Leu Gln Thr Leu His Gln Ser Leu Thr Asp Lys Thr Ser Asp Phe
 65 70 75 80

Arg Leu Ile Leu Gly Leu Leu Ala Phe Gly Phe Ile Leu Asn Thr Val
 85 90 95

Phe Arg Trp Thr Arg Lys Val Glu Lys Arg Pro Ile Arg Thr Leu Gly
 100 105 110

Phe Tyr Arg Glu Asn Phe Leu Ser Asn Leu Leu Lys Gly Phe Ser Leu
 115 120 125

Gly Leu Ala Leu Phe Leu Leu Thr Leu Leu Gly Leu Val Val Leu Gly
 130 135 140

Gln Tyr Arg Leu Glu Ser Ile His Leu Asn Pro Tyr Ser Leu Ala Phe
 145 150 155 160

Val Val Phe Thr Ile Pro Phe Trp Ile Leu Gln Gly Thr Ala Glu Glu
 165 170 175

Val Val Ala Arg Ala Trp Leu Leu Pro Gln Leu Ala Ser Arg Thr Asn
 180 185 190

Leu Lys Leu Ala Ile Leu Ile Ser Ser Leu Phe Phe Thr Leu Leu His
 195 200 205

Met Gly Asn Ser Gly Leu Thr Pro Leu Ser Leu Val Asn Leu Phe Leu
 210 215 220

Phe Gly Val Ala Met Ala Leu Tyr Leu Leu Lys Thr Asp Thr Val Trp
 225 230 235 240

Gly Val Ala Gly Ile His Gly Ala Trp Asn Phe Ala Gln Gly Asn Leu
 245 250 255

Phe Gly Ile Leu Val Ser Gly Gln Pro Ser Glu Arg Leu
 260 265

<210> 318

<211> 721

<212> PRT

<213> Streptococcus pneumoniae

<400> 318

Met Lys Lys Lys Phe Leu Ala Phe Leu Leu Ile Leu Phe Pro Ile Phe
 1 5 10 15

Ser Leu Gly Ile Ala Lys Ala Glu Thr Ile Lys Ile Val Ser Asp Thr
 20 25 30

Ala Tyr Ala Pro Phe Glu Phe Lys Asp Ser Asp Gln Thr Tyr Lys Gly
 35 40 45

Ile Asp Val Asp Ile Ile Asn Lys Val Ala Glu Ile Lys Gly Trp Asn
 50 55 60

Ile Gln Met Ser Tyr Pro Gly Phe Asp Ala Ala Val Asn Ala Val Gln
 65 70 75 80

Ala Gly Gln Ala Asp Ala Ile Met Ala Gly Met Thr Lys Thr Lys Glu
 85 90 95

Arg Glu Lys Val Phe Thr Met Ser Asp Thr Tyr Tyr Asp Thr Lys Val
 100 105 110

Val Ile Ala Thr Thr Lys Ser His Lys Ile Ser Lys Tyr Asp Gln Leu
 115 120 125

Thr Gly Lys Thr Val Gly Val Lys Asn Gly Thr Ala Ala Gln Arg Phe
 130 135 140

Leu Glu Thr Ile Lys Asp Lys Tyr Gly Phe Thr Ile Lys Thr Phe Asp
 145 150 155 160

Thr Gly Asp Leu Met Asn Asn Ser Leu Ser Ala Gly Ala Ile Asp Ala
 165 170 175

Met Met Asp Asp Lys Pro Val Ile Glu Tyr Ala Ile Asn Gln Gly Gln
 180 185 190

Asp Leu His Ile Glu Met Asp Gly Glu Ala Val Gly Ser Phe Ala Phe
 195 200 205

Gly Val Lys Lys Gly Ser Lys Tyr Glu His Leu Val Thr Glu Phe Asn
 210 215 220

Gln Ala Leu Ser Glu Met Lys Lys Asp Gly Ser Leu Asp Lys Ile Ile
 225 230 235 240

Lys Lys Trp Thr Ala Ser Ser Ser Ser Ala Val Pro Thr Thr Thr Thr
 245 250 255

Leu Ala Gly Leu Lys Ala Ile Pro Val Lys Ala Lys Tyr Ile Ile Ala
 260 265 270

Ser Asp Ser Ser Phe Ala Pro Phe Val Phe Gln Asn Ser Ser Asn Gln
 275 280 285

Tyr Thr Gly Ile Asp Met Glu Leu Ile Lys Ala Ile Ala Lys Asp Gln
 290 295 300

Gly Phe Glu Ile Glu Ile Thr Asn Pro Gly Phe Asp Ala Ala Ile Ser
 305 310 315 320

Ala Val Gln Ala Gly Gln Ala Asp Gly Ile Ile Ala Gly Met Ser Val
 325 330 335

Thr Asp Ala Arg Lys Ala Thr Phe Asp Phe Ser Glu Ser Tyr Tyr Thr
 340 345 350
 Ala Asn Thr Ile Leu Gly Val Lys Glu Ser Ser Asn Ile Ala Ser Tyr
 355 360
 Glu Asp Leu Lys Gly Lys Thr Val Gly Val Lys Asn Gly Thr Ala Ser
 370 375 380
 Gln Thr Phe Leu Thr Glu Asn Gln Ser Lys Tyr Gly Tyr Lys Ile Lys
 385 390 395 400
 Thr Phe Ala Asp Gly Ser Ser Met Tyr Asp Ser Leu Asn Thr Gly Ala
 405 410 415
 Ile Asp Ala Val Met Asp Asp Glu Pro Val Leu Lys Tyr Ser Ile Ser
 420 425 430
 Gln Gly Gln Lys Leu Lys Thr Pro Ile Ser Gly Thr Pro Ile Gly Glu
 435 440 445
 Thr Ala Phe Ala Val Lys Lys Gly Ala Asn Pro Glu Leu Ile Glu Met
 450 455 460
 Phe Asn Asn Gly Leu Ala Asn Leu Lys Ala Asn Gly Glu Phe Gln Lys
 465 470 475 480
 Ile Leu Asp Lys Tyr Leu Ala Ser Glu Ser Ser Thr Ala Ser Thr Ser
 485 490 495
 Thr Val Asp Glu Thr Thr Leu Trp Gly Leu Leu Gln Asn Asn Tyr Lys
 500 505 510
 Gln Leu Leu Ser Gly Leu Gly Ile Thr Leu Ala Leu Ala Leu Ile Ser
 515 520 525
 Phe Ala Ile Ala Ile Val Ile Gly Ile Ile Phe Gly Met Phe Ser Val
 530 535 540
 Ser Pro Tyr Lys Ser Leu Arg Val Ile Ser Glu Ile Phe Val Asp Val
 545 550 555 560

Ile Arg Gly Ile Pro Leu Met Ile Leu Ala Ala Phe Ile Phe Trp Gly
565 570 575

Ile Pro Asn Phe Ile Glu Ser Ile Thr Gly Gln Gln Ser Pro Ile Asn
580 585 590

Asp Phe Val Ala Gly Thr Ile Ala Leu Ser Leu Asn Ala Ala Ala Tyr
595 600 605

Ile Ala Glu Ile Val Arg Gly Gly Ile Gln Ala Val Pro Val Gly Gln
610 615 620

Met Glu Ala Ser Arg Ser Leu Gly Ile Ser Tyr Gly Lys Thr Met Arg
625 630 635 640

Lys Ile Ile Leu Pro Gln Ala Thr Lys Leu Met Leu Pro Asn Phe Val
645 650 655

Asn Gln Phe Val Ile Ala Leu Lys Asp Thr Thr Ile Val Ser Ala Ile
660 665 670

Gly Leu Val Glu Leu Phe Gln Thr Gly Lys Ile Ile Ile Ala Arg Asn
675 680 685

Tyr Gln Ser Phe Lys Met Tyr Ala Ile Leu Ala Ile Phe Tyr Leu Val
690 695 700

Ile Ile Thr Leu Leu Thr Arg Leu Ala Lys Arg Leu Glu Lys Arg Ile
705 710 715 720

Arg

<210> 319
<211> 246
<212> PRT
<213> Streptococcus pneumoniae

<400> 319

Met Ala Lys Leu Lys Ile Asp Val Asn Asp Leu His Lys His Tyr Gly
1 5 10 15

Lys Asn Glu Val Leu Lys Gly Ile Thr Thr Lys Phe Tyr Glu Gly Asp
 20 25 30

Val Val Cys Ile Ile Gly Pro Ser Gly Ser Gly Lys Ser Thr Phe Leu
 35 40 45

Arg Ser Leu Asn Leu Leu Glu Glu Val Thr Ser Gly His Ile Thr Val
 50 55 60

Asn Gly Tyr Asp Leu Thr Glu Lys Thr Thr Asn Val Asp His Val Arg
 65 70 75 80

Glu Asn Ile Gly Met Val Phe Gln His Phe Asn Leu Phe Pro His Met
 85 90 95

Ser Val Leu Asp Asn Ile Thr Phe Ala Pro Ile Glu His Lys Leu Met
 100 105 110

Thr Lys Glu Glu Ala Glu Glu Leu Gly Met Glu Leu Leu Glu Lys Val
 115 120 125

Gly Leu Ala Asp Lys Ala Asn Ala Asn Pro Asp Ser Leu Ser Gly Gly
 130 135 140

Gln Lys Gln Arg Val Ala Ile Ala Arg Gly Leu Ala Met Asn Pro Asp
 145 150 155 160

Ile Met Leu Phe Asp Glu Pro Thr Ser Ala Leu Asp Pro Glu Met Val
 165 170 175

Gly Asp Val Leu Asn Val Met Lys Glu Leu Ala Glu Gln Gly Met Thr
 180 185 190

Met Ile Ile Val Thr His Glu Met Gly Phe Ala Arg Gln Val Ala Asn
 195 200 205

Arg Val Ile Phe Thr Ala Asp Gly Glu Phe Leu Glu Asp Gly Thr Pro
 210 215 220

Asp Gln Ile Phe Asp Asn Pro Gln His Pro Arg Leu Lys Glu Phe Leu

225 230 235 240

Asp Lys Val Leu Asn Val
245

<210>	320
<211>	119
<212>	PRT
<213>	Streptococcus pneumoniae

<400> 320

Met Arg Ile Ile Tyr Leu Ile Ile Gly Phe Leu Ser Leu Thr Leu Ala
1 5 10 15

Ile Val Gly Val Val Leu Pro Leu Leu Pro Thr Thr Pro Phe Leu Leu
20 25 30

Leu Ser Ile Ala Cys Phe Ser Arg Ser Ser Lys Arg Phe Glu Asp Trp
35 40 45

Leu Tyr His Thr Lys Leu Tyr Gln Ala Tyr Val Ala Asp Phe Arg Glu
50 55 60

Thr Lys Ser Ile Ala Arg Glu Arg Lys Lys Lys Ile Ile Val Ser Ile
65 70 75 80

Tyr Val Leu Met Gly Ile Ser Ile Tyr Phe Ala Pro Leu Leu Pro Val
85 90 95

Lys Ile Gly Leu Gly Ala Leu Thr Ile Phe Ile Thr Tyr Tyr Leu Phe
100 105 110

Lys Val Ile Pro Asp Lys Glu
115

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<210> 321
<211> 162
<212> PRT
<213> Streptococcus pneumoniae
```

<400> 321

Met Ser Tyr Leu Arg Phe Phe Phe Ala Phe Phe Ile Leu Leu Ala Ile
1 5 10 15

Arg Phe Met Asp Cys Phe Met Ala Asn Ser Pro Ile Leu Pro Phe Lys
 20 25 30

Pro Pro Pro Asn Ile Trp Leu Ile Ser Gly Ile Pro Ala Pro Pro Arg
 35 40 45

Ala Asp Lys Ser Gly Ile Pro Pro Cys Pro Ile Ile Pro Ser Arg Ala
 50 55 60

Asp Ile Ser Ile Pro Pro Ile Phe Gly Ile Phe Leu Gly Arg Leu Phe
 65 70 75 80

Gly Leu Ile Pro Ile Cys Phe Ile Ile Leu Phe Ile Ser Pro Asp Ile
 85 90 95

Thr Pro Cys Met Ser Cys Leu Ala Trp Leu Lys Ser Leu Met Asn Leu
 100 105 110

Leu Thr Ser Thr Asn Val Phe Pro Glu Pro Ala Ala Ile Arg Arg Arg
 115 120 125

Arg Leu Gly Phe Asn Lys Ser Gly Phe Ser Arg Ser Ser Gly Val Ile
 130 135 140

Glu Asp Thr Met Ala Arg Leu Arg Ala Ile Trp Arg Ser Ser Thr Phe
 145 150 155 160

Met Phe

<210> 322

<211> 124

<212> PRT

<213> Streptococcus pneumoniae

<400> 322

Met Lys Lys Glu Gln Phe Tyr Pro Leu Gly Ile Phe Leu Ala Ala Met
 1 5 10 15

Leu Gly Gly Leu Val Arg Tyr Leu Val Ser Thr Trp Leu Pro Ala Ser
 20 25 30

Pro Asp Phe Pro Trp Gly Thr Leu Phe Val Asn Tyr Leu Gly Ile Phe
35 40 45

Cys Leu Ile Tyr Leu Val Lys Gly Tyr Leu Val Tyr Lys Gly Thr Ser
50 55 60

Lys Gly Leu Ile Leu Ala Leu Gly Thr Gly Phe Cys Gly Gly Leu Thr
65 70 75 80

Thr Phe Ser Ser Leu Met Leu Asp Thr Val Lys Leu Leu Asp Thr Gly
85 90 95

Arg Tyr Leu Ser Leu Ile Leu Tyr Leu Leu Ser Ile Gly Gly Gly
100 105 110

Leu Leu Leu Ala Tyr Tyr Leu Gly Arg Lys Lys Trp
115 120

<210> 323

<211> 663

<212> PRT

<213> Streptococcus pneumoniae

<400> 323

Met Ala Ile Ser Gln Met Lys Arg Ile Ser Leu Leu Phe Ser Lys Ser
1 5 10 15

Ser Leu Asp Asp Val Leu Lys Thr Ile Gln Glu Leu Glu Ser Val Gln
20 25 30

Phe Arg Asp Leu Lys Val Gln Asp Asn Trp Ser Glu Ala Leu Glu Lys
35 40 45

Asp Glu Val Val Phe Pro Thr Ile Gln Ile Phe His Thr Ser Asn Ser
50 55 60

Asn His Gly Val Ile Glu Gly Asn Asp Ala Leu Thr Tyr Leu Met Asn
65 70 75 80

Gln Gln Gln His Leu Glu Ala Thr Val Glu Lys Leu Gln Glu Tyr Leu
85 90 95

Pro Lys Glu Asn Thr Phe Lys Leu Leu Gln Gln Pro Pro Ile Thr Thr
 100 105 110

Ser Tyr Glu Glu Leu Glu Lys Phe Gly Lys Ala Asn Val Ala Glu Gly
 115 120 125

Val Leu Lys Lys Val Asn His Gln Ile Asn Arg Val His Glu Leu Glu
 130 135 140

Arg His Ile Gln Ser Asn Asn Glu Glu Ile Glu Arg Leu Ile Lys Trp
 145 150 155 160

Glu Lys Leu Glu Ile Val Pro Ala Asn Leu Gln Gln Phe Ser Phe Cys
 165 170 175

Lys Gly Lys Val Gly Thr Ile Pro Arg Thr Glu Asp Asn Arg Leu Tyr
 180 185 190

Asn Ser Leu Leu Glu Asn Asn Ile Glu Val Gln Glu Ile Phe Ser Asn
 195 200 205

Asp Arg Glu Tyr Gly Val Val Val Phe Tyr Gln Ser Ser Tyr Ser Ile
 210 215 220

Asp Phe Asp Glu Tyr Leu Phe Glu Pro Phe Asp Tyr Ser Arg Lys Glu
 225 230 235 240

Leu Pro Lys Gln Arg Val Val Asp Leu Asp Gln Glu Asn Met Gln Leu
 245 250 255

Ile Thr Glu Lys Glu Asn Ile Ile Ala Ser Leu Gln Asp Ser Lys Lys
 260 265 270

Tyr Leu Ile Asp Leu Gln Trp Gln Ile Asp Tyr Ile Leu Ser Ile Tyr
 275 280 285

Ala Arg Gln Ile Ser Lys Asn Asn Phe Leu Cys Thr Pro His Leu Val
 290 295 300

Ala Leu Glu Gly Trp Ile Glu Glu Thr Arg Ile Leu Tyr Phe Ile Lys

305		310		315		320
Val Met Asp	Glu His Phe Gly His Ser	Ile Tyr Ile Tyr Glu Ser Glu				
	325	330			335	
Thr Leu Thr	Asp Asn Gln Asp Glu Ile	Pro Ile Lys Leu Thr Asn His				
	340	345			350	
Ser Leu Ile	Glu Pro Phe Glu Leu Thr Glu Met Tyr Ala Leu Pro					
	355	360			365	
Lys Tyr Tyr	Glu Lys Asp Pro Thr Pro Val Leu Ala Pro Phe Tyr Phe					
	370	375			380	
Thr Phe Phe	Gly Met Met Val Ala Asp Leu Gly Tyr Gly Leu Leu Leu					
	385	390			395	400
Phe Leu Gly	Thr Met Leu Ala Leu Lys Ile Phe His Leu Pro Ser Ala					
	405	410			415	
Thr Lys Arg	Phe Leu Lys Phe Phe Asn Ile Leu Gly Val Ala Val Ala					
	420	425			430	
Ile Trp Gly	Gly Ile Tyr Gly Ser Phe Phe Gly Tyr Glu Leu Pro Phe					
	435	440			445	
His Leu Ile	Ser Thr Thr Ser Asp Val Met Thr Ile Leu Val Val Ser					
	450	455			460	
Val Val Phe	Gly Phe Ile Thr Val Phe Ala Gly Leu Leu Ala Ser Gly					
	465	470			475	480
Leu Gln Lys	Val Arg Met Asn Lys Tyr Ala Glu Ala Tyr Asn Ser Gly					
	485	490			495	
Phe Ala Trp	Cys Val Ile Leu Leu Gly Leu Leu Phe Ile Ala Val Gly					
	500	505			510	
Met Leu Met	Pro Asp Met Arg Pro Leu Phe Val Leu Gly Lys Trp Val					
	515	520			525	

Ser Ile Phe Asn Ala Val Gly Ile Leu Ile Val Ser Ile Ile Gln Thr
 530 535 540

Lys Ser Leu Ser Gly Ile Gly Ala Gly Leu Phe Asn Leu Tyr Asn Ile
 545 550 555 560

Ser Ser Tyr Ile Gly Asp Leu Val Ser Phe Thr Arg Leu Met Ala Leu
 565 570 575

Gly Leu Ser Gly Ala Ser Ile Ala Ser Ala Phe Asn Leu Ile Val Gly
 580 585 590

Leu Phe Pro Gly Ile Leu Ala Lys Leu Thr Ile Gly Leu Val Leu Phe
 595 600 605

Ile Leu Leu His Ala Ile Asn Ile Phe Leu Ser Leu Leu Ser Gly Tyr
 610 615 620

Val His Gly Ala Arg Leu Ile Phe Val Glu Phe Phe Gly Lys Phe Tyr
 625 630 635 640

Glu Gly Gly Gly Lys Pro Phe Gln Pro Leu Lys Ala Ser Glu Lys Tyr
 645 650 655

Ile Lys Val Ile Thr Lys Asn
 660

<210> 324

<211> 296

<212> PRT

<213> Streptococcus pneumoniae

<400> 324

Met Lys Ile Ile Gly Ile Asp Ile Gly Gly Thr Thr Ile Lys Ala Asp
 1 5 10 15

Leu Tyr Asp Glu Phe Gly Thr Ser Leu Asn His Phe Lys Glu Ile Glu
 20 25 30

Thr Ile Ile Asp Tyr Asp Leu Gly Thr Asn Gln Ile Leu Asn Gln Val
 35 40 45

Cys Asp Leu Ile Gly Glu Tyr Thr Leu Asn His Ser Ile Asp Gly Val
 50 55 60

Gly Ile Ser Thr Ala Gly Val Val Asn Ala Asn Thr Gly Glu Ile Ile
 65 70 75 80

Tyr Ala Gly Tyr Thr Ile Pro Gly Tyr Ile Gly Val Asn Phe Thr Ala
 85 90 95

Glu Ile Glu Lys Arg Phe Gly Leu Tyr Thr Phe Val Glu Asn Asp Val
 100 105 110

Asn Cys Ala Ala Leu Gly Glu Leu Trp Lys Gly Gln Ala Lys Asp Lys
 115 120 125

Lys Asn Val Val Met Val Thr Ile Gly Thr Gly Ile Gly Gly Ser Ile
 130 135 140

Ile Val Asn Gly Gln Ile Val Asn Gly Phe Asn Tyr Thr Ala Gly Glu
 145 150 155 160

Val Gly Tyr Ile Pro Val Gly Asn Ser Asp Trp Gln Ser Lys Ala Ser
 165 170 175

Thr Thr Ala Leu Ile His Leu Tyr Gln Lys Lys Ser Leu Lys Thr Asn
 180 185 190

Gln Thr Gly Arg Thr Phe Phe Thr Asp Leu Arg Ser Gly Asp Lys Val
 195 200 205

Ala Glu Glu Thr Phe Glu Ile Phe Val Glu Asn Leu Thr Lys Gly Leu
 210 215 220

Leu Thr Ile Ser Tyr Leu Leu Asn Pro Glu Ile Leu Ile Leu Gly Gly
 225 230 235 240

Gly Ile Leu Asp Ser Lys Asp Ile Leu Leu Pro Glu Ile Gln Ser Ser
 245 250 255

Leu Ala Lys Asn Ala Met Asp Asn Arg Phe Leu Pro Lys Asn Leu Val
 260 265 270

Ala Ala Thr Leu Gly Asn Glu Ala Gly Arg Ile Gly Ala Val Lys Asn
 275 280 285

Phe Leu Asp Arg Ile Ser Asn Lys
 290 295

<210> 325

<211> 305

<212> PRT

<213> Streptococcus pneumoniae

<400> 325

Met Lys Asp Leu Thr Lys Tyr Lys Gly Val Ile Pro Ala Phe Tyr Ala
 1 5 10 15

Cys Tyr Asp Glu Asn Gly Glu Ile Ser Gln Asp Arg Val Lys Ser Leu
 20 25 30

Val Gln Tyr Phe Ile Asp Lys Gly Val Lys Gly Ile Tyr Val Asn Gly
 35 40 45

Ser Ser Gly Glu Cys Ile Tyr Gln Ser Val Glu Asp Arg Lys Gln Ile
 50 55 60

Ile Glu Ala Val Met Glu Val Ala Lys Gly Lys Leu Thr Val Ile Asn
 65 70 75 80

His Ile Ala Cys Asn Asn Thr Lys Asp Ser Ile Glu Leu Ala Lys His
 85 90 95

Ser Glu Ser Val Gly Val Asp Ala Ile Ala Ala Ile Pro Pro Ile Tyr
 100 105 110

Phe Lys Leu Pro Glu Tyr Ser Ile Ala Ala Tyr Trp Asn Ala Met Ser
 115 120 125

Glu Ala Ala Ser Asn Thr Asp Phe Ile Ile Tyr Asn Ile Pro Gln Leu
 130 135 140

Ala Gly Val Ala Leu Thr Gly Ser Leu Tyr Ala Thr Met Arg Gln Asn
 145 150 155 160

Pro Arg Val Ile Gly Val Lys Asn Ser Ser Met Pro Val Gln Asp Ile
165 170 175

Gln Met Phe Val Ala Ala Gly Gly Glu Asp Tyr Ile Val Phe Asn Gly
180 185 190

Pro Asp Glu Gln Tyr Leu Gly Gly Arg Leu Met Gly Ala Glu Ala Gly
195 200 205

Ile Gly Gly Thr Tyr Gly Val Met Pro Asp Leu Phe Leu Lys Leu Glu
210 215 220

Ser Leu Ile Gln Glu Arg Asp Leu Asp Thr Ala Lys Lys Leu Gln Tyr
225 230 235 240

Ala Ile Asn Glu Val Ile Tyr Lys Met Ile Ser Gly Lys Ala Asn Met
245 250 255

Tyr Ala Val Ala Lys Glu Val Leu Arg Leu Asn Glu Lys Leu Asp Leu
260 265 270

Gly Ser Val Arg Gln Pro Leu Glu Ala Leu Ala Glu Gly Asp Leu Glu
275 280 285

Val Ala Lys Gln Ala Ala Glu Leu Ile Gln Gln Ala Arg Lys Glu Phe
290 295 300

Leu
305

<210> 326
<211> 252
<212> PRT
<213> Streptococcus pneumoniae

<400> 326

Met Ile Gly Gly Lys Asn Met Asp Lys Asp Tyr Ile Leu Lys Val Lys
1 5 10 15

Gly Leu Tyr His Gln Phe Leu Leu Gly Asn Asn Lys Thr Leu Gln Val
20 25 30

Leu Lys Asn Val Ser Leu Ser Ala Ser Arg Gly Glu Phe Ile Ser Ile
 35 40 45

Leu Gly Ile Ser Gly Ser Gly Lys Ser Thr Leu Leu Lys Cys Ile Ser
 50 55 60

Ser Leu Leu Glu Pro Thr Ser Gly Glu Val Ile Leu Asn Gly Ile Asn
 65 70 75 80

Pro Tyr Lys Ile Arg Asn Ala Lys Leu Ser Ser Ile Arg Arg Asn Glu
 85 90 95

Val Ser Phe Ile Phe Gln Ala Tyr Asn Leu Ile Pro Ser Leu Pro Val
 100 105 110

Ile Glu Asn Ile Ala Leu Pro Leu Arg Leu Ser Gln Lys Lys Leu Thr
 115 120 125

Ile Lys Asn Val Glu Asn Leu Leu Lys Arg Met Lys Phe Asn Ala Gly
 130 135 140

Leu Asn Asp Phe Val Gly Thr Leu Ser Gly Gly Glu Gln Gln Lys Val
 145 150 155 160

Ala Ile Ala Arg Ala Val Ile Ala Asp Ser Asp Ile Ile Phe Ala Asp
 165 170 175

Glu Pro Thr Gly Ala Leu Asp Ser Val Ser Arg Glu Val Ile Phe Glu
 180 185 190

Leu Leu Arg Glu Leu Val Gly Ala Gly Lys Cys Val Ile Met Val Thr
 195 200 205

His Asp Ile Glu Leu Ala Ser Lys Thr Asp Arg Ala Leu Ile Leu Lys
 210 215 220

Asp Gly Lys Ile Phe Lys Glu Leu His Arg Pro Ser Gly Glu Glu Leu
 225 230 235 240

Tyr Lys Ile Leu Glu Val Gln Ser Thr Thr Glu Glu
 245 250

<210> 327
 <211> 535
 <212> PRT
 <213> *Streptococcus pneumoniae*
 <400> 327
 Met Asn Tyr Leu Lys Phe Ile Lys Lys Thr Lys Leu Ile Leu Met Gly
 1 5 10 15
 Ile Leu Ile Phe Leu Ser Ser Phe Asn Gly Val Leu Leu Ser Gly Ile
 20 25 30
 Ile Val Tyr Ala Gly Ser Leu Asn Gln Thr Ser Ser Phe Ser Asp Val
 35 40 45
 Leu Arg Phe Gly Ala Ile Ser Ile Leu Gly Trp Ser Ala Ile Tyr Ile
 50 55 60
 Ser Asn Tyr Tyr Leu Glu Val Thr Glu Ala Ser Ile Thr Lys Asp Ile
 65 70 75 80
 Asn Val Lys Ile Lys Gln Gly Tyr Phe Arg Glu Gln Tyr Leu Ser Ser
 85 90 95
 Glu Met Val Lys Asp Tyr Ser Ser Ile Ile Ser Val Leu Ser Asn Asp
 100 105 110
 Leu Arg Leu Ile Glu Glu Asn Tyr Phe Arg Gln Ile Phe Glu Ile Ile
 115 120 125
 Ser Ser Ile Leu Leu Phe Ile Val Ser Leu Ser Phe Met Leu Tyr Leu
 130 135 140
 Asn Phe Leu Val Ser Ile Ile Phe Ile Val Leu Ser Ala Leu Pro Ile
 145 150 155 160
 Ile Val Pro Val Phe Met Lys Lys Met Leu Ser Asn Ser Ala Asn Glu
 165 170 175
 Tyr Ser Asn Ser Asn Ala Glu Tyr Thr His Ile Ile Lys Glu Ile Phe
 180 185 190

Asn Gly Phe Lys Thr Leu Lys Ser Tyr Ser Val Thr Lys Glu Ile Ile
 195 200 205

Ser Leu Ser Asp Lys Lys Leu Asp Lys Leu Glu Asp Ser Thr Phe Asn
 210 215 220

Leu Lys Arg Ser Glu Val Leu Ser Lys Leu Val Ala Val Leu Ile Ser
 225 230 235 240

Gly Phe Cys Phe Leu Val Pro Leu Val Val Gly Cys Tyr Phe Val Ile
 245 250 255

Tyr His Lys Ser Leu Ser Phe Ser Glu Leu Ile Gly Ile Phe Leu Ala
 260 265 270

Asn Asp Lys Val Leu Gly Pro Ile Gln Ser Ile Ala Tyr Ser Leu Asn
 275 280 285

Lys Ile Asn Thr Thr Lys Asp Leu Arg Lys Pro Phe Leu Lys Tyr Leu
 290 295 300

Ser Gly Glu Lys Asn Phe Ile Asp Ala Glu His Asp Asn Asn Gly Leu
 305 310 315 320

Tyr Thr Ser Ser Ile Asp Glu Ile His Met Lys Asp Val Val Tyr Ser
 325 330 335

Ile Thr Pro Glu Asn Lys Leu Ser Ile Asp Phe Ser Phe Lys Ser Pro
 340 345 350

Phe Arg Val Leu Leu Thr Gly Thr Ser Gly Ser Gly Lys Thr Thr Ile
 355 360

Leu Asn Leu Ile Asn Gly Ser Leu Lys Pro Gln Lys Gly Tyr Val Asn
 370 375 380

Leu Leu Ser His Gly Lys Lys Ser Ser Asp Ser Ile Pro Thr Val Asp
 385 390 395 400

Gln Thr Pro Tyr Ile Phe Asp Thr Thr Ile Arg Glu Asn Val Thr Leu

405 410 415

Phe Gln Asn Glu Tyr Phe Ser Asp Asp Gln Ile Ile Glu Val Leu Lys
420 425 430

Lys Val Asn Leu Tyr Glu Glu Leu Glu Lys Ile Asp Ile Leu Asn Tyr
435 440 445

Gln Cys Gly Glu Asn Gly Ser Asn Leu Ser Gly Gly Gln Lys Gln Lys
450 455 460

Ile Ala Leu Ala Arg Ala Leu Ile Arg Asn Asn Lys Val Tyr Leu Phe
465 470 475 480

Asp Glu Ile Ser Ala Asn Leu Asp Asn Asp Asn Ser Asn Ser Ile His
485 490 495

Asp Ile Leu Phe Asn Leu Gly Ile Ser Phe Ile Glu Val Ser His His
500 505 510

Tyr Asp Leu Asn Asp Lys Arg Tyr Thr Asp Ile Tyr Lys Leu Glu Asn
515 520 525

Gly Thr Leu Phe Lys Ile Lys
530 535

<210> 328
<211> 646
<212> FRT
<213> Streptococcus pneumoniae

<400> 328

Met Asn Gln Ser Asn Glu Ile Phe Leu Asn Thr Ile Gln Glu Lys Thr
1 5 10 15

His Tyr Lys Arg Ser Ile Ser Ser Ser Phe Gln Glu Leu Lys Lys Trp
20 25 30

Asn Ser Leu Ile Phe Arg Arg Gly Arg Tyr Trp Tyr Gln Phe Asp Asn
35 40 45

Trp Ser Ile Pro Asn Thr Gly Val Ile Lys Glu Trp Tyr Val Glu Asp

50	55	60
Asn Asp Trp Ile Pro Lys Val Ser Ser Ser Ser Leu Asp Asn Ser Asn		
65	70	75
Ser Leu Lys Ile Val Phe Asp Val Glu Lys Tyr Thr Leu Pro Asp Asp		
	85	90
Ser Ile Leu Gln Asp Val Arg Ile Ser Ser Asp Glu Ser Tyr Ile Val		
	100	105
Leu Val Val Ser Ser Leu Arg Thr Thr Asn Leu Ile Gly Ile Lys Lys		
	115	120
Tyr Thr Met Glu Glu Leu Phe Ile Ile Glu Asp Ile Ser Val Glu Ser		
	130	135
Ser Phe Tyr Leu Gly Lys Phe Gly Val Met Tyr Thr Arg Ser Lys Glu		
	145	150
Tyr Gly Arg Pro Ser Lys Leu Phe Tyr Lys Ser Phe Asp Ser Phe Thr		
	165	170
Glu Glu Glu Leu Phe Glu Glu Asn Glu Cys Ser Phe Arg Leu Lys Ile		
	180	185
Val His Ile Asp Ser Asn Asn Cys Phe Val Lys Ser Val Asp Phe Gln		
	195	200
Lys Gly Arg Ile Phe Leu Tyr Ser Phe Asp Arg Thr Gly Phe Val Arg		
	210	215
His Ser Tyr Thr Glu Thr Val Ala Pro Thr Pro Arg Asp Ile Ala Leu		
	225	230
Phe Ser Thr Glu Lys Ala Gln Tyr Phe Leu Gly Leu Ser Ser Thr Glu		
	245	250
Glu Lys Lys Asp Gln Leu Ile Leu Arg Glu Thr Ser Ser Gly Asp Arg		
	260	265

Val Ser Ile Thr Ile Pro Tyr Gln Asp Arg Ala Arg Arg Val His Cys
 275 280 285

Ile Gly Arg Tyr Ile Leu Leu Asp Cys Ser Asn Ala Ala Asn Ser Val
 290 295 300

Phe Tyr Leu Ala Thr Phe Lys Asn Asn Ser Leu Arg Glu Leu Ser Val
 305 310 315 320

Asn Lys Ile Thr Phe Asp Glu Lys Thr Thr Leu Tyr Glu Asn Ser Phe
 325 330 335

Ser Asp Arg Val Leu Leu Phe Leu Glu Arg Arg Thr Phe Tyr Glu Lys
 340 345 350

Ile Leu Ser Phe Asp Leu Ile Glu Asn Thr Leu Lys Thr Glu Phe Glu
 355 360 365

Arg Pro Ile Ile Lys Ser Asn Asn Thr Lys Tyr Phe Ser Lys Val Ile
 370 375 380

Trp Thr Lys Lys Asp Ser Tyr Asp Val Ser Ile Pro Ile Ser Leu Phe
 385 390 395 400

Trp Lys Ser Glu Asp Thr Asp Glu Leu Pro Arg Arg Lys Lys Cys Ile
 405 410 415

Leu Ser Val Tyr Gly Ala Tyr Gly Lys Asn Asp Asn Ser Asp Leu Asp
 420 425 430

Glu Ile Met Leu Ser Ile Ile Asp Ala Gly Phe Ile Tyr Ala Ile Val
 435 440 445

His Val Arg Gly Gly Gly Tyr Leu Gly Gly Glu Trp Tyr Arg Ser Gly
 450 455 460

Lys Ala Leu Asn Lys Trp Asn Ser Ile Arg Asp Phe Ile Glu Gly Val
 465 470 475 480

Asn Tyr Leu Arg Glu Asn Asp Val Ile Asp Ser Lys Arg Leu Gly Leu
 485 490 495

Ile Thr Ser Ser Ala Gly Gly Ile Ile Ala Gly Ala Val Leu Asn Glu
500 505 510

Glu Lys Asn Leu Leu Gln Ser Ile Leu Leu Phe Ser Pro Phe Ile Asn
515 520 525

Pro Tyr Asp Thr Leu Gln Asn Pro Asn Asp Pro Leu Ser Lys Thr Glu
530 535 540

Ile Ala Glu Trp Gly Asp Ile Arg Asp Pro Glu Val Lys Ala Tyr Ile
545 550 555 560

Lys Ser Tyr Ser Pro Met Gln Asn Ile Glu Lys Ala Arg Asp Ser Asn
565 570 575

Thr Val Ile Val Asn Ile Leu Gly Glu Lys Asp Pro Tyr Ile Asn Asn
580 585 590

Asn Glu Val Ile Glu Trp Ser Lys Lys Leu Asn Ser Ile Gly Val Lys
595 600 605

Ser Leu Leu Tyr Leu Asn Lys Ala Ala Gly His Gly Gly Phe Thr Pro
610 615 620

Ser Asp Val Leu Leu Met Ile Asp Thr Leu Asn Tyr Phe Phe Glu Glu
625 630 635 640

Val Gly Arg Asn Asn Leu
645

<210> 329

<211> 477

<212> PRT

<213> Streptococcus pneumoniae

<400> 329

Met Ile Asp Gly Lys Arg Leu Leu Phe Ser Leu Thr Ile Val Ser Tyr
1 5 10 15

Ala Leu Thr Leu Val Ser Gly Ile Val Tyr Leu Phe Asn Asn Asn Asn
20 25 30

Val Ser Leu Leu Ser Thr Leu Leu Phe Leu Leu Val Ser Ser Leu Ile
 35 40 45

Ala Cys Trp Asn Asp Ile Lys Tyr Tyr Leu Ile His Phe Ile Phe Tyr
 50 55 60

Leu Thr Ile Phe Val Phe Leu Val Ser Arg Pro Thr Ile Asp Tyr Phe
 65 70 75 80

Arg Asp Gly Ala Leu Asp Thr Tyr His Pro Ile Ala Tyr Arg Phe Ala
 85 90 95

Phe Ile Val Val Met Ile Ser Ile Leu Gly Leu Thr Thr Gly Gly Ile
 100 105 110

Leu Ala Arg Tyr Phe Ile Ala Arg Lys Lys Ile Lys Val Ala Asn Ile
 115 120 125

Gly Asn Ser Leu Lys Glu Val Tyr Ile Lys Arg Leu Arg Phe Val Ser
 130 135 140

Leu Gly Val Phe Leu Leu Thr Tyr Pro Phe Tyr Phe Ile Arg Leu Phe
 145 150 155 160

Glu Arg Leu Leu Tyr Arg Leu Gln Thr Ser Tyr Tyr Ala Tyr Tyr Ala
 165 170 175

Asn Phe Glu Ser Lys Leu Pro Tyr Phe Thr Tyr Ile Leu Ser Thr Phe
 180 185 190

Thr Val Tyr Ala Met Cys Met Tyr Leu Ala Thr Lys Pro Lys Lys Leu
 195 200 205

Gln Ala Thr Ala Val Leu Val Ser Phe Ile Ala Ala Asn Thr Ile His
 210 215 220

Leu Ala Ile Gly Thr Arg Asn Pro Phe Ile Leu Ser Ile Leu Phe Ala
 225 230 235 240

Phe Val Tyr Tyr Phe Met Arg Glu Gln Thr Glu Lys Gly Lys Trp Ile
 245 250 255

Gly Phe Lys Glu Lys Leu Ala Ile Phe Val Gly Ser Pro Ile Leu Met
 260 265 270
 Leu Ala Met Gly Val Leu Asn Tyr Val Arg Asp Asn Val Gln Val Ser
 275 280 285
 His Thr Gly Phe Trp Asp Ile Leu Leu Asp Phe Ile Tyr Lys Gln Gly
 290 295 300
 Thr Ser Phe Gly Val Leu Ala Arg Gly Phe Leu Phe Asn Ser Ser Leu
 305 310 315 320
 Pro Tyr Arg Asp Phe Arg Asn Phe Thr Phe Gly Pro Val Leu Asp Tyr
 325 330 335
 Phe Ala Arg Gly Ser Leu Gly Ala Ile Phe Gly Gly Lys Ala Phe Glu
 340 345 350
 His Thr Thr Asn Ser Val Glu Leu Ala Ile Asp Ser Asn Ser Tyr Ala
 355 360 365
 His Asn Leu Ser Tyr Leu Val Leu Asn Lys Glu Tyr Leu Lys Gly His
 370 375 380
 Gly Ile Gly Ser Ser Tyr Ile Met Glu Leu Tyr Thr Asp Tyr Gly Met
 385 390 395 400
 Ile Gly Val Phe Leu Leu Ser Phe Leu Leu Gly Val Leu Phe Ile Ala
 405 410 415
 Met Leu Gln Val Ala Tyr Arg Ser Arg Thr Ile Leu Phe Ala Leu Ser
 420 425 430
 Leu Leu Ile Leu Asn Asn Leu Phe Phe Met Pro Arg Ser Ser Phe Ser
 435 440 445
 Glu Ser Phe Phe Asn Leu Phe Thr Met Gln Phe Trp Gly Ile Val Leu
 450 455 460
 Val Ile Ile Phe Val Ala Lys Met Leu Thr Lys Glu Asn

465 470 475

 <210> 330
 <211> 275
 <212> PRT
 <213> *Streptococcus pneumoniae*

 <400> 330

 Met Gln Ser Arg Arg Lys Glu Met Lys Lys Thr Ser Ser Lys Leu Phe
 1 5 10 15

 Val Val Pro Tyr Met Leu Trp Ile Ala Leu Phe Val Leu Ala Pro Leu
 20 25 30

 Val Leu Ile Phe Gly Gln Ser Phe Phe Asn Ile Glu Gly Gln Phe Ser
 35 40 45

 Leu Glu Asn Tyr Lys Ser Tyr Phe Ala Ser Gln Asn Leu Thr Tyr Leu
 50 55 60

 Lys Met Ser Phe Asn Ser Val Leu Tyr Ala Gly Ile Val Thr Phe Val
 65 70 75 80

 Ala Leu Leu Ile Ser Tyr Pro Thr Ala Leu Phe Leu Thr Arg Leu Lys
 85 90 95

 His Arg Gln Leu Trp Leu Met Leu Ile Ile Leu Pro Thr Trp Ile Asn
 100 105 110

 Leu Leu Leu Lys Ala Tyr Ala Phe Ile Gly Ile Phe Gly Gln Asn Gly
 115 120 125

 Ser Ile Asn Gln Phe Leu Glu Phe Ile Gly Ile Gly Ser Gln Gln Leu
 130 135 140

 Leu Phe Thr Asp Phe Ser Phe Ile Phe Val Ala Ser Tyr Ile Glu Leu
 145 150 155 160

 Pro Phe Met Ile Leu Pro Ile Phe Asn Val Leu Asp Asp Met Asp Asn
 165 170 175

 Asn Leu Ile Asn Ala Ser Tyr Asp Leu Gly Ala Thr Lys Trp Glu Thr

180 185 190
 Phe Arg His Val Ile Phe Pro Leu Ser Met Asn Gly Val Arg Ser Gly
 195 200 205
 Val Gln Ser Val Phe Ile Pro Ser Leu Ser Leu Phe Met Leu Thr Arg
 210 215 220
 Leu Ile Gly Gly Asn Arg Val Ile Thr Leu Gly Thr Ala Ile Glu Gln
 225 230 235 240
 Asn Phe Leu Thr Asn Asp Asn Tyr Gly Met Gly Ser Thr Ile Gly Val
 245 250 255
 Ile Leu Ile Leu Thr Met Phe Ile Thr Met Trp Val Thr Lys Glu Arg
 260 265 270
 Arg Glu Arg
 275

 <210> 331
 <211> 252
 <212> PRT
 <213> Streptococcus pneumoniae

 <400> 331
 Met Thr Asp Ala Ile Leu Gln Val Ser Asp Leu Ser Val Tyr Tyr Asn
 1 5 10 15
 Lys Lys Lys Ala Leu Asn Ser Val Ser Leu Ser Phe Gln Pro Lys Glu
 20 25 30
 Ile Thr Ala Leu Ile Gly Pro Ser Gly Ser Gly Lys Ser Thr Leu Leu
 35 40 45
 Lys Ser Leu Asn Arg Met Gly Asp Leu Asn Pro Glu Val Thr Thr Thr
 50 55 60
 Gly Ser Val Val Tyr Asn Gly His Asn Ile Tyr Ser Pro Arg Thr Asp
 65 70 75 80
 Thr Val Glu Leu Arg Lys Glu Ile Gly Met Val Phe Gln Gln Pro Asn

	85	90	95
Pro Phe Pro Met Thr Ile Tyr Glu Asn Val Val Tyr Gly Leu Arg Ile	100	105	110
Asn Gly Ile Lys Asp Lys Gln Val Leu Asp Glu Ala Val Glu Lys Ala	115	120	125
Leu Gln Gly Ala Ser Ile Trp Asp Glu Val Lys Asp Arg Leu Tyr Asp	130	135	140
Ser Ala Ile Gly Leu Ser Gly Gly Gln Gln Gln Arg Val Cys Val Ala	145	150	155
Arg Val Leu Ala Thr Ser Pro Lys Ile Ile Leu Leu Asp Glu Pro Thr	165	170	175
Ser Ala Leu Asp Pro Ile Ser Ala Gly Lys Ile Glu Glu Thr Leu Tyr	180	185	190
Gly Leu Lys Asp Lys Tyr Thr Met Leu Leu Val Thr Arg Ser Met Gln	195	200	205
Gln Ala Ser Arg Ile Ser Asp Lys Thr Gly Phe Phe Leu Asp Gly Asp	210	215	220
Leu Ile Glu Phe Asn Asp Thr Lys Gln Met Phe Leu Asp Pro Gln His	225	230	235
Lys Glu Thr Glu Asp Tyr Ile Thr Gly Lys Phe Gly	245	250	
<210> 332			
<211> 294			
<212> PRT			
<213> Streptococcus pneumoniae			
<400> 332			
Met Arg Ala Lys Lys Leu Asp Lys Leu Ala Thr Ala Val Leu Tyr Thr	1	5	10
Ile Ala Ser Ile Ile Val Thr Ile Leu Ala Ser Leu Ile Leu Tyr Ile			15

	20		25		30	
Leu Val Arg Gly Leu Pro His Ile Ser Trp Ser Phe Leu Thr Gly Arg						
	35		40		45	
Ser Ser Ala Phe Gln Ala Gly Gly Gly Ile Gly Ile Gln Leu Tyr Asn						
	50		55		60	
Ser Phe Phe Leu Leu Val Ile Thr Leu Ile Ile Ser Val Pro Leu Ser						
	65		70		75	80
Met Gly Ala Gly Ile Tyr Leu Ala Glu Tyr Ala Lys Lys Gly Pro Val						
		85		90		95
Thr Asn Phe Val Arg Thr Cys Ile Glu Ile Leu Ser Ser Leu Pro Ser						
	100		105		110	
Val Val Val Gly Leu Phe Gly Tyr Leu Ile Phe Val Val Gln Phe Glu						
	115		120		125	
Tyr Gly Phe Ser Ile Ile Ser Gly Ala Leu Ala Leu Thr Val Phe Asn						
	130		135		140	
Leu Pro Gln Met Thr Arg Asn Val Glu Asp Ser Leu Lys His Val His						
	145		150		155	160
His Thr Gln Arg Glu Ala Gly Leu Ala Leu Gly Ile Ser Arg Trp Glu						
		165		170		175
Thr Val Val His Val Val Ile Pro Glu Ala Leu Pro Gly Ile Val Thr						
	180		185		190	
Gly Val Val Leu Ala Ser Gly Arg Ile Phe Gly Glu Ala Ala Ala Leu						
	195		200		205	
Ile Tyr Thr Ala Gly Gln Ser Ala Pro Ala Leu Asp Trp Ser Asn Trp						
	210		215		220	
Asn Ile Leu Ser Val Thr Ser Pro Ile Ser Ile Phe Arg Gln Ala Glu						
	225		230		235	240

Thr Leu Ala Val His Ile Trp Lys Val Asn Ser Glu Gly Thr Ile Pro
245 250 255

Asp Gly Thr Ile Val Ser Ala Gly Ser Ala Ala Val Leu Leu Ile Phe
260 265 270

Ile Leu Ile Phe Asn Phe Gly Ala Arg Lys Phe Gly Ser Tyr Leu His
275 280 285

Lys Lys Leu Thr Ala Ala
290

<210> 333

<211> 586

<212> PRT

<213> Streptococcus pneumoniae

<400> 333

Met Leu Met Lys Ile Tyr Lys Lys Leu Phe Ala Tyr Val Gln Asp Lys
1 5 10 15

Lys Tyr Leu Gly Val Leu Ala Ile Ile Phe Ser Ala Ile Ser Ala Ala
20 25 30

Leu Thr Val Tyr Gly Tyr Tyr Leu Ile Tyr Lys Phe Leu Asp Lys Leu
35 40 45

Ile Ile Asn Ser Asn Leu Ser Gly Ala Glu Ser Ile Ala Leu Lys Ser
50 55 60

Val Ile Thr Leu Thr Ser Gly Ala Ile Phe Tyr Phe Val Ser Gly Met
65 70 75 80

Phe Ser His Ile Leu Gly Phe Arg Leu Glu Thr Asn Leu Arg Lys Arg
85 90 95

Gly Ile Asp Gly Leu Glu Lys Ala Ser Phe Arg Phe Phe Asp Leu Asn
100 105 110

Pro Ser Gly Gln Ile Arg Lys Ile Ile Asp Asp Asn Ala Ala Gln Thr
115 120 125

His Gln Val Val Ala His Met Ile Pro Asp Ser Ser Gln Ala Ile Ile
 130 135 140

Thr Pro Val Leu Val Leu Ala Leu Gly Phe Ile Val Ser Ile Arg Val
 145 150 155 160

Gly Ile Ile Leu Leu Ala Leu Thr Ile Ile Gly Gly Leu Ile Leu Gly
 165 170 175

Ala Met Met Gly Glu Gln Glu Phe Met Lys Ile Tyr Gln Glu Ser Leu
 180 185 190

Ser Lys Leu Ser Ala Glu Thr Val Glu Tyr Val Arg Gly Met Gln Val
 195 200 205

Val Lys Ile Phe Lys Ala Asn Val Glu Ser Phe Lys Ser Phe Tyr Lys
 210 215 220

Ala Ile Lys Asp Tyr Ser Lys Tyr Ala Tyr Asp Tyr Ser Leu Ser Cys
 225 230 235 240

Lys Arg Pro Tyr Val Leu Tyr Gln Trp Leu Phe Phe Gly Leu Ile Ala
 245 250 255

Ile Leu Ile Ile Pro Ile Val Tyr Phe Met Thr Ser Leu Ala Ser Ala
 260 265 270

Lys Val Ile Leu Leu Glu Leu Ile Met Ile Leu Phe Leu Ser Gly Val
 275 280 285

Leu Phe Val Ser Phe Met Arg Met Met Trp Tyr Ser Met Tyr Ile Ser
 290 295 300

Gln Gly Asn Tyr Ala Val Asp Thr Leu Glu Ala Leu Tyr Glu Asp Met
 305 310 315 320

Gln Lys Asp Lys Leu Val His Gly Asn Val Asn Asn Phe Lys Asn Tyr
 325 330 335

Asn Ile Glu Phe Glu Asn Val Ser Phe Ala Tyr Asn Asp Lys Ala Val
 340 345 350

Ile Glu Asn Leu Ser Phe Asn Leu Glu Glu Gly Lys Ser Tyr Ala Leu
 355 360 365

Val Gly Ser Ser Gly Ser Gly Lys Ser Thr Val Ala Lys Leu Ile Ser
 370 375 380

Gly Phe Tyr Asn Val Asn Lys Gly Ser Ile Lys Ile Gly Gly Ile Ala
 385 390 395 400

Ile Ser Glu Tyr Ser Asp Glu Ala Leu Ile Lys Ala Ile Ser Phe Val
 405 410 415

Phe Gln Asp Ser Lys Leu Phe Lys Lys Ser Ile Tyr Asp Asn Val Ala
 420 425 430

Leu Ala Asn Lys Asp Ala Thr Lys Asp Asp Val Met Arg Ala Leu Lys
 435 440 445

Leu Ala Gly Cys Asp Leu Ile Leu Asp Lys Phe Pro Glu Arg Glu Asn
 450 455 460

Thr Ile Ile Gly Ser Lys Gly Val Tyr Leu Ser Gly Gly Glu Lys Gln
 465 470 475 480

Arg Ile Ala Ile Ala Arg Ala Ile Leu Lys Asp Ser Lys Ile Ile Ile
 485 490 495

Met Asp Glu Ala Ser Ala Ser Ile Asp Pro Asp Asn Glu Phe Glu Leu
 500 505 510

Gln Lys Ala Phe Lys Asn Leu Met Lys Asp Lys Thr Val Ile Met Ile
 515 520 525

Ala His Arg Leu Ser Thr Ile Lys Asp Leu Asp Glu Ile Ile Val Met
 530 535 540

Asp Ser Gly Lys Ile Ile Glu Arg Gly Ser Asp Lys Glu Leu Met Ser
 545 550 555 560

Lys Asp Thr Arg Tyr Lys Ser Leu Gln Glu Met Phe Asn Ser Ala Asn
 565 570 575

Glu Trp Arg Val Ser Asn Glu Arg Val Leu
580 585

<210> 334

<211> 581

<212> PRT

<213> Streptococcus pneumoniae

<400> 334

Met Arg Met Asn Gly Gly Phe Gln Met Lys Glu Phe Tyr Lys Lys Arg
1 5 10 15

Phe Ala Leu Thr Asp Gly Gly Ala Arg Asn Leu Ser Lys Ala Thr Leu
20 25 30

Ala Ser Phe Phe Val Tyr Cys Ile Asn Met Leu Pro Ala Ile Leu Leu
35 40 45

Met Ile Phe Ala Gln Glu Val Leu Glu Asn Met Gly Lys Ser Asn Gly
50 55 60

Phe Tyr Ile Val Phe Ser Val Leu Ile Leu Ile Ala Met Tyr Ile Leu
65 70 75 80

Leu Ser Ile Glu Tyr Asp Lys Leu Tyr Asn Thr Thr Tyr Gln Glu Ser
85 90 95

Ala Asp Leu Arg Ile Arg Thr Ala Glu Asn Leu Ser Lys Leu Pro Leu
100 105 110

Ser Tyr Phe Ser Lys His Asp Ile Ser Asp Ile Ser Gln Thr Ile Met
115 120 125

Ala Asp Ile Glu Gly Ile Glu His Ala Met Ser His Ser Ile Pro Lys
130 135 140

Val Gly Gly Met Val Leu Phe Phe Pro Leu Ile Ser Val Met Met Leu
145 150 155 160

Ala Gly Asn Val Lys Met Gly Leu Ala Val Ile Ile Pro Ser Ile Leu
165 170 175

Ser Phe Ile Phe Ile Pro Leu Ser Lys Lys Tyr Gln Val Asn Gly Gln
 180 185 190
 Asn Arg Tyr Tyr Asp Val Leu Arg Lys Asn Ser Glu Ser Phe Gln Glu
 195 200 205
 Asn Ile Glu Met Gln Met Glu Ile Lys Ala Tyr Asn Leu Ser Lys Asp
 210 215 220
 Ile Lys Asp Asp Leu Tyr Lys Lys Met Glu Asp Ser Glu Lys Val His
 225 230 235 240
 Leu Lys Ala Glu Val Thr Thr Ile Leu Thr Leu Ser Ile Ser Ser Ile
 245 250 255
 Phe Ser Phe Ile Ser Leu Ala Val Val Ile Phe Val Gly Val Asn Leu
 260 265 270
 Ile Ile Asn Lys Glu Ile Asn Ser Leu Tyr Leu Ile Gly Tyr Leu Leu
 275 280 285
 Ala Ala Met Lys Ile Lys Asp Ser Leu Asp Ala Ser Lys Glu Gly Leu
 290 295 300
 Met Glu Ile Phe Tyr Leu Ser Pro Lys Ile Glu Arg Leu Lys Glu Ile
 305 310 315 320
 Gln Asn Gln Asp Leu Gln Glu Gly Asp Asp Tyr Ser Leu Lys Lys Phe
 325 330 335
 Asp Ile Asp Leu Lys Asp Val Glu Phe Ala Tyr Asn Lys Asp Ala Lys
 340 345 350
 Val Leu Asn Gly Val Ser Phe Lys Ala Lys Gln Gly Glu Val Thr Ala
 355 360 365
 Leu Val Gly Ala Ser Gly Cys Gly Lys Thr Thr Ile Leu Lys Leu Ile
 370 375 380
 Ser Arg Leu Tyr Asp Tyr Asp Lys Gly Gln Ile Leu Ile Asp Gly Lys

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385              390              395              400

Asp Ile Lys Glu Ile Ser Thr Glu Ser Leu Phe Asp Lys Val Ser Ile
      405              410              415

Val Phe Gln Asp Val Val Leu Phe Asn Gln Ser Val Met Glu Asn Ile
      420              425              430

Arg Ile Gly Lys Gln Asp Ala Ser Asp Glu Glu Val Lys Arg Ala Ala
      435              440              445

Lys Leu Ala Asn Cys Thr Asp Phe Ile Glu Lys Met Asp Lys Gly Phe
      450              455              460

Asp Thr Val Ile Gly Glu Asn Gly Ala Glu Leu Ser Gly Gly Glu Arg
      465              470              475              480

Gln Arg Leu Ser Ile Ala Arg Ala Phe Leu Lys Asp Ala Pro Ile Leu
      485              490              495

Ile Leu Asp Glu Ile Thr Ala Ser Leu Asp Val Asn Asn Glu Lys Lys
      500              505              510

Ile Gln Glu Ser Leu Asn Asn Leu Val Lys Asp Lys Thr Val Val Ile
      515              520              525

Ile Ser His Arg Met Lys Ser Ile Glu Asn Ala Asp Lys Ile Val Val
      530              535              540

Leu Gln Asn Gly Arg Val Glu Ser Glu Gly Lys His Glu Glu Leu Leu
      545              550              555              560

Gln Lys Ser Lys Ile Tyr Lys Asn Leu Ile Glu Lys Thr Lys Met Ala
      565              570              575

Glu Glu Phe Ile Tyr
      580

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<210> 335
<211> 209
<212> PRT
<213> Streptococcus pneumoniae

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<400> 335

Met Asp Asn Lys Lys Leu Lys Val Lys Asp Leu Val Ser Ile Gly Val
 1 5 10 15

Phe Gly Val Ile Tyr Phe Ala Phe Met Phe Gly Val Gly Met Met Gly
 20 25 30

Leu Ile Pro Ile Leu Phe Leu Ile Tyr Pro Thr Val Leu Ala Ile Val
 35 40 45

Ala Gly Thr Val Val Met Leu Phe Met Ala Lys Val Gln Lys Pro Trp
 50 55 60

Ala Leu Phe Ile Phe Gly Met Ile Ser Pro Leu Val Met Phe Ala Ala
 65 70 75 80

Gly His Thr Tyr Val Val Val Val Leu Ser Leu Ile Val Met Ile Ile
 85 90 95

Ala Glu Leu Ile Arg Lys Ile Gly Asn Tyr Asn Ser Phe Lys Tyr Asn
 100 105 110

Met Leu Ser Tyr Ala Ile Phe Ser Thr Trp Ile Cys Ser Ser Leu Met
 115 120 125

Gln Met Leu Leu Ala Lys Glu Lys Tyr Met Glu Trp Ser Leu Met Thr
 130 135 140

Met Gly Lys Asp Tyr Val Asp Val Leu Glu Lys Leu Ile Thr Tyr Pro
 145 150 155 160

His Met Ala Leu Val Ala Leu Gly Ala Phe Leu Gly Gly Ile Leu Gly
 165 170 175

Ala Tyr Ile Gly Lys Ala Leu Leu Lys Lys His Phe Ser Asn Gly Leu
 180 185 190

Tyr Cys Val Gly Tyr Phe Thr Pro Cys Leu Ile Leu Trp Cys Tyr Leu
 195 200 205

Asn

<210> 336
 <211> 169
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 336

Met Cys Gly Ile Leu Tyr Ser Leu Pro Asn Phe Met Val Leu Ser Glu
 1 5 10 15

Leu Asn Pro Ile Val Lys Met Phe Leu Ser Ile Pro Ile Val Ile Arg
 20 25 30

Met Phe Ile Leu Pro Phe Met Ala Ala Ser Phe Met Ile Lys Thr Ser
 35 40 45

Asp Val Gly Ala Ile Ile Ser Ser Met Asp Lys Leu Lys Ile Ser Lys
 50 55 60

Asn Val Ser Ile Pro Ile Ala Val Met Phe Arg Phe Phe Pro Ser Phe
 65 70 75 80

Lys Glu Glu Lys Lys Asn Ile Lys Met Ala Met Arg Val Arg Gly Ile
 85 90 95

Asn Phe Lys Asn Pro Val Lys Tyr Leu Glu Tyr Val Ser Val Pro Leu
 100 105 110

Leu Ile Ile Ser Ser Asn Ile Ser Asp Asp Ile Ala Lys Ala Ala Glu
 115 120 125

Thr Lys Ala Ile Glu Asn Pro Ile Ala Lys Thr Arg Tyr Ile Arg Val
 130 135 140

Lys Ile Gln Leu Ile Asp Phe Val Tyr Val Leu Ala Val Ala Gly Leu
 145 150 155 160

Ile Val Gly Gly Leu Ile Trp Leu Lys
 165

<210> 337

<211> 374

<212> PRT

<213> Streptococcus pneumoniae

<400> 337

Met Val Glu Ile Lys Asn Leu Ser Leu Asp Tyr Gly Glu Glu His Ile
 1 5 10 15

Leu Asp Asp Ile Ser Leu Ser Ile Ala Glu Gly Glu Cys Val Leu Phe
 20 25 30

Thr Gly Lys Ser Gly Asn Gly Lys Ser Ser Leu Ile Asn Ser Ile Asn
 35 40 45

Gly Leu Ala Val Arg Tyr Asp Asn Ala Lys Thr Lys Gly Glu Ile Ile
 50 55 60

Ile Asp Gly Lys Asn Ile Lys Asn Leu Glu Leu Tyr Gln Ile Ser Met
 65 70 75 80

Leu Val Ser Thr Val Phe Gln Asn Pro Lys Thr Tyr Phe Phe Asn Val
 85 90 95

Asn Thr Thr Leu Glu Leu Leu Phe Tyr Leu Glu Asn Ile Gly Leu Ala
 100 105 110

Arg Glu Glu Met Asp Arg Arg Leu Lys Asp Ile Leu Glu Ile Phe Pro
 115 120 125

Ile Lys Asn Leu Leu Asn Arg Asn Ile Phe Asn Leu Ser Gly Gly Glu
 130 135 140

Lys Gln Ile Leu Cys Ile Ala Ala Ser Tyr Ile Ala Gly Thr Lys Ile
 145 150 155 160

Ile Val Met Asp Glu Pro Ser Ser Asn Leu Asp Ile Lys Ser Ile Ser
 165 170 175

Val Leu Ala Lys Met Leu Lys Ile Leu Lys Glu Lys Gly Ile Ser Ile
 180 185 190

Ile Val Ala Glu His Arg Ile Tyr Tyr Leu Met Asp Ile Val Asp Arg
 195 200 205

Val Phe Leu Ile Asp Lys Gly Lys Leu Lys Lys Thr Tyr Thr Arg Ser
 210 215 220

Glu Phe Leu Lys Leu Asp Lys Asn Glu Leu Asn Ala Leu Ser Leu Arg
 225 230 235 240

Asp Lys Glu Leu Ser Lys Leu Lys Val Pro Tyr Leu Lys Glu Gly Gly
 245 250 255

Glu Tyr Gln Ile Lys Asn Leu Ser Tyr Lys Phe Thr Asp Asp Glu Cys
 260 265 270

Leu Ser Leu Lys Asp Ile Ser Phe Lys Leu Gly Lys Ile Tyr Gly Ile
 275 280 285

Ile Gly Ser Asn Gly Arg Gly Lys Ser Thr Leu Leu Arg Cys Leu Ile
 290 295 300

Gly Leu Glu Lys Lys Ser Lys Glu Glu Ile Tyr Phe Lys Gly Glu Lys
 305 310 315 320

Leu Ser Lys Lys Glu Arg Leu Lys Asn Ser Ser Leu Val Met Gln Asp
 325 330 335

Val Asn His Gln Leu Phe Thr Asp Glu Val Phe Asn Glu Leu Arg Leu
 340 345 350

Gly Val Lys Asn Phe Asp Glu Glu Lys Ala Lys Ile Ile Leu Asn Pro
 355 360 365

Asn Tyr Ser Pro Gln Ile
 370

<210> 338
 <211> 75
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 338

Met Ser Leu Ser Gly Gly Gln Lys Gln Arg Leu Ala Ile Ala Ser Val
 1 5 10 15

Met Cys Lys Asn Ser Pro Phe Val Phe Phe Asp Glu Pro Ser Ser Gly
 20 25 30

Met Asp Tyr Ser Asn Met Ile Lys Ile Ser Glu Leu Ile Asn Lys Tyr
 35 40 45

Lys Thr Met Asp Lys Ile Ile Phe Ile Val Ser His Asp Ile Glu Phe
 50 55 60

Leu Asn Glu Val Ala Asp Glu Ile Phe Glu Leu
 65 70 75

<210> 339

<211> 318

<212> PRT

<213> Streptococcus pneumoniae

<400> 339

Met Asp Ile Arg Pro Gln Ser Ser Asp Glu Leu Asp Ser Gln Arg Arg
 1 5 10 15

Val Arg Arg Asp Met Ser Asn Ser Leu Lys Gly Thr Leu Leu Thr Val
 20 25 30

Val Ala Gly Ile Ala Trp Gly Leu Ser Gly Thr Ser Gly Gln Tyr Leu
 35 40 45

Met Ala His Gly Ile Ser Ala Leu Val Leu Thr Asn Leu Arg Leu Leu
 50 55 60

Ile Ala Gly Gly Ile Leu Met Leu Leu Ala Tyr Ala Thr Ala Lys Asp
 65 70 75 80

Lys Ile Leu Val Phe Leu Lys Asp Arg Lys Ser Leu Leu Ser Leu Leu
 85 90 95

Ile Phe Ala Leu Ile Gly Leu Phe Leu Asn Gln Phe Ala Tyr Leu Ser
 100 105 110

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Ala Ile Gln Glu Thr Asn Ala Gly Thr Ala Thr Val Leu Gln Tyr Val
    115                      120                      125

Cys Pro Val Gly Ile Leu Ile Tyr Ser Cys Ile Lys Asp Arg Val Ala
    130                      135                      140

Pro Thr Leu Gly Glu Ile Val Ser Ile Ile Phe Ala Ile Gly Gly Thr
    145                      150                      155                      160

Phe Leu Ile Ala Thr His Gly Gln Leu Asp Gln Leu Ser Met Thr Pro
    165                      170                      175

Ala Gly Leu Phe Trp Gly Leu Phe Ser Ala Leu Thr Tyr Ala Leu Tyr
    180                      185                      190

Ile Ile Leu Pro Ile Ala Leu Ile Lys Lys Trp Gly Ser Ser Leu Val
    195                      200                      205

Ile Gly Val Gly Met Val Ile Ala Gly Leu Val Ala Leu Pro Phe Thr
    210                      215                      220

Gly Val Leu Gln Ala Asp Ile Pro Thr Ser Leu Asp Phe Leu Leu Ala
    225                      230                      235                      240

Phe Ala Gly Ile Ile Leu Ile Gly Thr Val Phe Ala Tyr Thr Ala Phe
    245                      250                      255

Leu Lys Gly Ala Ser Leu Ile Gly Pro Val Lys Ser Ser Leu Leu Ala
    260                      265                      270

Ser Ile Glu Pro Ile Ser Ala Ile Phe Phe Ala Phe Leu Ile Met Asn
    275                      280                      285

Glu Gln Phe Tyr Pro Ile Asp Phe Leu Gly Met Ala Met Ile Leu Phe
    290                      295                      300

Ala Val Thr Leu Ile Ser Leu Lys Asp Leu Phe Leu Glu Lys
    305                      310                      315

<210> 340
<211> 79
<212> PRT

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<213> Streptococcus pneumoniae

<400> 340

Met Leu Leu Leu Ala Lys Glu Lys Val Ala Cys Leu Leu Thr Val Thr
1 5 10 15

Cys Leu Ala Met Leu Phe Ala Met Pro Ala Leu Leu Thr Thr Leu
20 25 30

Thr Lys Met Glu Lys Asn Thr Val Ser Asn Ser Lys Ala Thr Thr Pro
35 40 45

Leu Leu Phe Ser Met Lys Leu Thr Thr Leu Thr Val Ser Cys Phe Thr
50 55 60

Ile Ala Ser Met Lys Lys Thr His Leu Gln Leu Lys Met Val Tyr
65 70 75

<210> 341

<211> 78

<212> PRT

<213> Streptococcus pneumoniae

<400> 341

Met Arg Glu Ile Met Leu Leu Gln Leu Phe Ser Leu Tyr Phe Glu Ser
1 5 10 15

Leu Ile Leu Thr Thr Ile Leu Val Leu Ile Phe Leu Gly Ile Trp Ile
20 25 30

Gly Leu Arg Ala Met Ser Gly Val Asp Lys Thr Ala Arg Ala Arg Gln
35 40 45

Ala His Leu Tyr Asp Met Ile Met Ile Gly Val Leu Val Val Pro Val
50 55 60

Leu Ser Phe Ala Val Met Ser Leu Ile Leu Val Phe Lys Ala
65 70 75

<210> 342

<211> 176

<212> PRT

<213> Streptococcus pneumoniae

<400> 342

Met Gln Lys Lys Tyr Val Lys Ile Leu Tyr Ser Ser Pro Ile Gly Ile
 1 5 10 15

Leu Ser Leu Val Ala Asp Asp His Tyr Leu Tyr Gly Ile Trp Val Gln
 20 25 30

Glu Gln Lys His Phe Glu Arg Gly Leu Gly Asp Glu Thr Ile Glu Glu
 35 40 45

Val Val Ser His Pro Ile Leu Asp Pro Val Ile Ala Cys Leu Asp Asp
 50 55 60

Tyr Phe Lys Gly Lys Pro Gln Asp Leu Ser Asn Leu Leu Leu Ala Pro
 65 70 75 80

Ile Gly Thr Asn Phe Glu Lys Arg Val Trp Asp Tyr Leu Gln Gly Ile
 85 90 95

Pro Tyr Gly Gln Thr Val Thr Tyr Gly Gln Ile Ala Gln Asp Leu Gln
 100 105 110

Val Ala Ser Ala Gln Ala Ile Gly Gly Ala Val Gly Arg Asn Pro Trp
 115 120 125

Ser Ile Leu Val Pro Cys His Arg Val Leu Gly Ala Gly Lys Arg Leu
 130 135 140

Thr Gly Tyr Ala Ala Gly Val Glu Lys Lys Ala Trp Leu Leu Glu His
 145 150 155 160

Glu Gly Val Asp Phe Lys Asp Arg Ser Asn Arg Arg Arg Ser Thr Cys
 165 170 175

<210> 343

<211> 480

<212> PRT

<213> Streptococcus pneumoniae

<400> 343

Met Pro Asn Cys Ile Ile Glu Ile Ile Ala Gln Ile Cys Tyr Asp Ile

1	5	10	15
Asn Met Asn Lys Ser Arg Leu Gly Arg Gly Arg His Gly Lys Thr Arg	20	25	30
His Val Leu Leu Ala Leu Ile Gly Ile Leu Ala Ile Ser Ile Cys Leu	35	40	45
Leu Gly Gly Phe Ile Ala Phe Lys Ile Tyr Gln Gln Lys Ser Phe Glu	50	55	60
Gln Lys Ile Glu Ser Leu Lys Lys Glu Lys Asp Asp Gln Leu Ser Glu	65	70	75
Gly Asn Gln Lys Glu His Phe Arg Gln Gly Gln Ala Glu Val Ile Ala	85	90	95
Tyr Tyr Pro Leu Gln Gly Glu Lys Val Ile Ser Ser Val Arg Glu Leu	100	105	110
Ile Asn Gln Asp Val Lys Asp Lys Leu Glu Ser Lys Asp Asn Leu Val	115	120	125
Phe Tyr Tyr Thr Glu Gln Glu Glu Ser Gly Leu Lys Gly Val Val Asn	130	135	140
Arg Asn Val Thr Lys Gln Ile Tyr Asp Leu Val Ala Phe Lys Ile Glu	145	150	155
Glu Thr Glu Lys Thr Ser Leu Gly Lys Val His Leu Thr Glu Asp Gly	165	170	175
Gln Pro Phe Thr Leu Asp Gln Leu Phe Ser Asp Ala Ser Lys Ala Lys	180	185	190
Glu Gln Leu Ile Lys Glu Leu Thr Ser Phe Ile Glu Asp Lys Lys Ile	195	200	205
Glu Gln Asp Gln Ser Glu Gln Ile Val Lys Asn Phe Ser Asp Gln Asp	210	215	220

Leu Ser Ala Trp Asn Phe Asp Tyr Lys Asp Ser Gln Ile Ile Leu Tyr
 225 230 235 240

Pro Ser Pro Val Val Glu Asn Leu Glu Glu Ile Ala Leu Pro Val Ser
 245 250 255

Ala Phe Phe Asp Val Ile Gln Ser Ser Tyr Leu Leu Glu Lys Asp Ala
 260 265 270

Ala Leu Tyr Gln Ser Tyr Phe Asp Lys Lys His Gln Lys Val Val Ala
 275 280 285

Leu Thr Phe Asp Asp Gly Pro Asn Pro Ala Thr Thr Pro Gln Val Leu
 290 295 300

Glu Thr Leu Ala Lys Tyr Asp Ile Lys Ala Thr Phe Phe Val Leu Gly
 305 310 315 320

Lys Asn Val Ser Gly Asn Glu Asp Leu Val Lys Arg Ile Lys Ser Glu
 325 330 335

Gly His Val Val Gly Asn His Ser Trp Ser His Pro Ile Leu Ser Gln
 340 345 350

Leu Ser Leu Asp Glu Ala Lys Lys Gln Ile Thr Asp Thr Glu Asp Val
 355 360 365

Leu Thr Lys Val Leu Gly Ser Ser Ser Lys Leu Met Arg Pro Pro Tyr
 370 375 380

Gly Ala Ile Thr Asp Asp Ile Arg Asn Ser Leu Asp Leu Ser Phe Ile
 385 390 395 400

Met Trp Asp Val Asp Ser Leu Asp Trp Lys Ser Lys Asn Glu Ala Ser
 405 410 415

Ile Leu Thr Glu Ile Gln Tyr Gln Val Ala Asn Gly Ser Ile Val Leu
 420 425 430

Met His Asp Ile His Ser Pro Thr Val Asn Ala Leu Pro Arg Val Ile
 435 440 445

Glu Tyr Leu Lys Asn Gln Gly Tyr Thr Phe Val Thr Ile Pro Glu Met
 450 455 460

Leu Asn Thr Arg Leu Lys Ala His Glu Leu Tyr Tyr Ser Arg Asp Glu
 465 470 475 480

<210> 344

<211> 232

<212> PRT

<213> Streptococcus pneumoniae

<400> 344

Met Val Ile Leu Phe Ile His Ala Ile Ile Gly Thr Ile Thr Phe Arg
 1 5 10 15

Arg Cys Ser Met Ser Tyr Leu Phe Glu Ile Leu Pro Ser Leu Leu Asn
 20 25 30

Gly Ala Ser Thr Thr Val Gln Val Phe Ala Leu Val Leu Leu Phe Ser
 35 40 45

Ile Pro Leu Gly Val Leu Ile Ala Phe Ala Leu Gln Val His Trp Lys
 50 55 60

Pro Leu His Tyr Leu Ile Asn Ile Tyr Ile Trp Val Met Arg Gly Thr
 65 70 75 80

Pro Leu Leu Leu Gln Leu Ile Phe Ile Tyr Tyr Val Leu Pro Ser Ile
 85 90 95

Gly Ile Arg Leu Asp Arg Leu Pro Ala Ala Ile Ile Ala Phe Val Leu
 100 105 110

Asn Tyr Ala Ala Tyr Phe Ala Glu Ile Phe Arg Gly Gly Ile Asp Thr
 115 120 125

Ile Pro Arg Gly Gln Tyr Glu Ala Ala Lys Val Leu Lys Phe Ser Pro
 130 135 140

Phe Asp Arg Val Arg Tyr Ile Ile Leu Pro Gln Val Thr Lys Ile Val
 145 150 155 160

Leu Pro Ser Val Phe Asn Glu Val Met Ser Leu Val Lys Asp Thr Ser
 165 170 175

Leu Val Tyr Ala Leu Gly Ile Ser Asp Leu Ile Leu Ala Ser Arg Thr
 180 185 190

Ala Ala Asn Arg Asp Ala Ser Leu Val Pro Met Phe Leu Ala Gly Ala
 195 200 205

Ile Tyr Leu Ile Leu Ile Gly Ile Val Thr Ile Ile Ser Lys Lys Val
 210 215 220

Glu Lys Lys Tyr Ser Tyr Tyr Arg
 225 230

<210> 345
 <211> 238
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 345

Met Glu Glu Ser Ile Asn Pro Ile Ile Ser Ile Gly Pro Val Ile Phe
 1 5 10 15

Asn Leu Thr Met Leu Ala Met Thr Leu Leu Ile Val Gly Val Ile Phe
 20 25 30

Val Phe Ile Tyr Trp Ala Ser Arg Asn Met Thr Leu Lys Pro Lys Gly
 35 40 45

Lys Gln Asn Val Leu Glu Tyr Val Tyr Asp Phe Val Ile Gly Phe Thr
 50 55 60

Glu Pro Asn Ile Gly Ser Arg Tyr Met Lys Asp Tyr Ser Leu Phe Phe
 65 70 75 80

Leu Cys Leu Phe Leu Phe Met Val Ile Ala Asn Asn Leu Gly Leu Met
 85 90 95

Thr Lys Leu Gln Thr Ile Asp Gly Thr Asn Trp Trp Ser Ser Pro Thr
 100 105 110

Ala Asn Leu Gln Tyr Asp Leu Thr Leu Ser Phe Leu Val Ile Leu Leu
 115 120 125

Thr His Ile Glu Ser Val Arg Arg Arg Gly Phe Lys Lys Ser Ile Lys
 130 135 140

Ser Phe Met Ser Pro Val Phe Val Ile Pro Met Asn Ile Leu Glu Glu
 145 150 155 160

Phe Thr Asn Phe Leu Ser Leu Ala Leu Arg Ile Phe Gly Asn Ile Phe
 165 170 175

Ala Gly Glu Val Met Thr Ser Leu Leu Leu Leu Ser His Gln Ala
 180 185 190

Ile Tyr Trp Tyr Pro Val Ala Phe Gly Ala Asn Leu Ala Trp Thr Ala
 195 200 205

Phe Ser Val Phe Ile Ser Cys Ile Gln Ala Tyr Val Phe Thr Leu Leu
 210 215 220

Thr Ser Val Tyr Leu Gly Asn Lys Ile Asn Ile Glu Glu Glu
 225 230 235

<210> 346

<211> 551

<212> PRT

<213> Streptococcus pneumoniae

<400> 346

Met Ser Glu Lys Ser Arg Glu Glu Glu Lys Leu Ser Phe Lys Glu Gln
 1 5 10 15

Ile Leu Arg Asp Leu Glu Lys Val Lys Gly Tyr Asp Glu Val Leu Lys
 20 25 30

Glu Asp Glu Ala Val Val Arg Thr Pro Ala Asn Glu Pro Ser Thr Glu
 35 40 45

Glu Leu Met Ala Asp Ser Leu Ser Thr Val Glu Glu Ile Met Arg Lys
 50 55 60

Ala Pro Thr Val Pro Thr His Pro Ser Gln Gly Val Pro Ala Ser Pro
 65 70 75 80

Ala Asp Glu Ile Gln Arg Glu Thr Pro Gly Val Pro Ser His Pro Ser
 85 90 95

Gln Asp Val Pro Ser Ser Pro Ala Glu Ser Gly Ser Arg Pro Gly
 100 105 110

Pro Gly Pro Val Arg Pro Lys Lys Leu Glu Arg Glu Tyr Asn Glu Thr
 115 120 125

Pro Thr Arg Val Ala Val Ser Tyr Thr Thr Ala Glu Lys Lys Ala Glu
 130 135 140

Gln Ala Gly Pro Glu Thr Pro Thr Pro Ala Thr Glu Thr Val Asp Ile
 145 150 155 160

Ile Arg Asp Thr Ser Arg Arg Ser Arg Arg Glu Gly Ala Lys Pro Val
 165 170 175

Lys Pro Lys Lys Glu Lys Lys Ser His Val Lys Ala Phe Val Ile Ser
 180 185 190

Phe Leu Val Phe Leu Ala Leu Leu Ser Ala Gly Gly Tyr Phe Gly Tyr
 195 200 205

Gln Tyr Val Leu Asp Ser Leu Leu Pro Ile Asp Ala Asn Ser Lys Lys
 210 215 220

Tyr Val Thr Val Gly Ile Pro Glu Gly Ser Asn Val Gln Glu Ile Gly
 225 230 235 240

Thr Thr Leu Glu Lys Ala Gly Leu Val Lys His Gly Leu Ile Phe Ser
 245 250 255

Phe Tyr Ala Lys Tyr Lys Asn Tyr Thr Asp Leu Lys Ala Gly Tyr Tyr
 260 265 270

Asn Leu Gln Lys Ser Met Ser Thr Glu Asp Leu Leu Lys Glu Leu Gln
 275 280 285

Lys Gly Gly Thr Asp Glu Pro Gln Glu Pro Val Leu Ala Thr Leu Thr
 290 295 300
 Ile Pro Glu Gly Tyr Thr Leu Asp Gln Ile Ala Gln Ala Val Gly Gln
 305 310 315 320
 Leu Gln Gly Asp Phe Lys Glu Ser Leu Thr Ala Glu Ala Phe Leu Ala
 325 330 335
 Lys Val Gln Asp Glu Thr Phe Ile Ser Gln Ala Val Ala Lys Tyr Pro
 340 345 350
 Thr Leu Leu Glu Ser Leu Pro Val Lys Asp Ser Gly Ala Arg Tyr Arg
 355 360 365
 Leu Glu Gly Tyr Leu Phe Pro Ala Thr Tyr Ser Ile Lys Glu Ser Thr
 370 375 380
 Thr Ile Glu Ser Leu Ile Asp Glu Met Leu Ala Ala Met Asp Lys Asn
 385 390 395 400
 Leu Ser Pro Tyr Tyr Ser Thr Ile Lys Ser Lys Asn Leu Thr Val Asn
 405 410 415
 Glu Leu Leu Thr Ile Ala Ser Leu Val Glu Lys Glu Gly Ala Lys Thr
 420 425 430
 Glu Asp Arg Lys Leu Ile Ala Gly Val Phe Tyr Asn Arg Leu Asn Arg
 435 440 445
 Asp Met Pro Leu Gln Ser Asn Ile Ala Ile Leu Tyr Ala Gln Gly Lys
 450 455 460
 Leu Gly Gln Asn Ile Ser Leu Ala Glu Asp Val Ala Ile Asp Thr Asn
 465 470 475 480
 Ile Asp Ser Pro Tyr Asn Val Tyr Lys Asn Val Gly Leu Met Pro Gly
 485 490 495
 Pro Val Asp Ser Pro Ser Leu Asp Ala Ile Glu Ser Ser Ile Asn Gln

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      500                      505                      510

Thr Lys Ser Asp Asn Leu Tyr Phe Val Ala Asp Val Thr Glu Gly Lys
    515                                520                                525


Val Tyr Tyr Ala Asn Asn Gln Glu Asp His Asp Arg Asn Val Ala Glu
    530                                  535                                  540



His Val Asn Ser Lys Leu Asn
545                        550




<210>   347
<211>   222
<212>   FRT
<213>   Streptococcus pneumoniae


<400>   347


Met Leu Thr Tyr Gly Gly Tyr Arg Val Ser Ala Gly Tyr Ile Ser Val
 1                               5                            10                             15

Gly Thr Leu Val Ser Phe Leu Ile Tyr Leu Phe Gln Leu Leu Asn Pro
   20                              25                                 30

Ile Ser Asn Ile Ala Asn Phe Val Thr Val Tyr Ser Arg Ser Lys Gly
   35                                   40                                    45

Ser Ser Val Ala Leu Glu Asn Leu Leu Ala Val Pro Lys Glu Lys Phe
   50                                     55                                         60

Glu Gly Gly Lys Ser Val Ser Gly Arg Gly Leu Asn Phe Asn His Val
 65          70           75

Tyr Phe Gly Tyr Asp Glu Asn Arg Pro Val Leu Lys Asp Ile Thr Cys
     85                           90                          95

Ser Ile Phe Lys Gly Gln Lys Ile Ala Phe Val Gly Pro Ser Gly Ser
   100                105                 110

Gly Lys Ser Thr Ile Val Arg Leu Leu Glu Arg Phe Tyr Lys Pro Leu
   115                   120                    125

Ser Gly Asp Ile Leu Met Glu Gln Ser Ser Ile Tyr Asp Phe Asn Leu

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130 135 140
 Lys Glu Trp Arg Ser Lys Ile Ala Trp Val Ser Gln Asn Asn Ala Val
 145 150 155 160
 Leu Ser Gly Ser Ile Arg Asp Asn Leu Cys Leu Gly Leu Asn Arg Leu
 165 170 175
 Val Thr Asp Asp Glu Leu Met Lys Val Leu Asp Leu Val Ser Leu Gly
 180 185 190
 Asp Glu Ile Arg Ser Met Lys Glu Gly Leu Asp Thr Glu Val Gly Glu
 195 200 205
 Arg Gly Arg Leu Leu Ser Gly Gly Arg Thr Lys Asp Phe Lys
 210 215 220
 <210> 348
 <211> 181
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 348
 Met Lys Leu Lys Leu Leu Arg Val Asp Thr Lys Val Ile Met Gly Ser
 1 5 10 15
 Phe Leu Leu Val Leu Ser Ser Leu Leu Ala Leu Leu Leu Pro Leu Ile
 20 25 30
 Leu Lys Asp Leu Ile Asp Gly Ser Ser Ile Glu Asn Ile Gly Ser Lys
 35 40 45
 Val Phe Gln Ser Phe Leu Ile Phe Ile Gly Gln Ala Leu Phe Ser Ser
 50 55 60
 Ile Gly Tyr Tyr Leu Phe Ser Gln Ser Gly Glu Lys Lys Ile Ala Lys
 65 70 75 80
 Ile Arg Lys Lys Val Ile Glu Gly Leu Ile Tyr Val Glu Lys Ser Phe
 85 90 95
 Phe Asp Lys Ser Gln Ser Gly Glu Leu Thr Ser Ala Ile Val Asn Asp

100 105 110
 Thr Ser Val Ile Arg Glu Phe Leu Ile Thr Thr Phe Pro Asn Ile Ile
 115 120 125
 Leu Ser Leu Val Met Val Leu Gly Ser Ile Val Val Leu Phe Ser Leu
 130 135 140
 Asp Trp Asn Leu Ser Leu Leu Phe Ile Thr Leu Pro Cys Met Met
 145 150 155 160
 Phe Ile Ile Leu Pro Leu Ser Asn Ile Ser Glu Lys Tyr Ser Arg Arg
 165 170 175
 Leu Gln Glu Glu Ile
 180
 <210> 349
 <211> 652
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 349
 Met Lys Lys Ser Lys Ser Lys Tyr Leu Thr Leu Ala Gly Leu Val Leu
 1 5 10 15
 Gly Thr Gly Val Leu Leu Ser Ala Cys Gly Asn Ser Ser Thr Ala Ser
 20 25 30
 Lys Thr Tyr Asn Tyr Val Tyr Ser Ser Asp Pro Ser Ser Leu Asn Tyr
 35 40 45
 Leu Ala Glu Asn Arg Ala Ala Thr Ser Asp Ile Val Ala Asn Leu Val
 50 55 60
 Asp Gly Leu Leu Glu Asn Asp Gln Tyr Gly Asn Ile Ile Pro Ser Leu
 65 70 75 80
 Ala Glu Asp Trp Thr Val Ser Gln Asp Gly Leu Thr Tyr Thr Tyr Lys
 85 90 95
 Leu Arg Lys Asp Ala Lys Trp Phe Thr Ser Glu Gly Glu Glu Tyr Ala

100	105	110
Pro Val Thr Ala Gln Asp Phe Val Thr Gly Leu Gln Tyr Ala Ala Asp		
115	120	125
Lys Lys Ser Glu Ala Leu Tyr Leu Val Gln Asp Ser Val Ala Gly Leu		
130	135	140
Asp Asp Tyr Ile Thr Gly Lys Thr Ser Asp Phe Ser Thr Val Gly Val		
145	150	155
Lys Ala Leu Asp Asp Gln Thr Val Gln Tyr Thr Leu Val Lys Pro Glu		
165	170	175
Leu Tyr Trp Asn Ser Lys Thr Leu Ala Thr Ile Leu Phe Pro Val Asn		
180	185	190
Ala Asp Phe Leu Lys Ser Lys Gly Asp Asp Phe Gly Lys Ala Asp Pro		
195	200	205
Ser Ser Ile Leu Tyr Asn Gly Pro Phe Leu Met Lys Ala Leu Val Ser		
210	215	220
Lys Ser Ala Ile Glu Tyr Lys Lys Asn Pro Asn Tyr Trp Asp Ala Lys		
225	230	235
Asn Val Phe Val Asp Asp Val Lys Leu Thr Tyr Tyr Asp Gly Ser Asp		
245	250	255
Gln Glu Ser Leu Glu Arg Asn Phe Thr Ala Gly Ala Tyr Thr Thr Ala		
260	265	270
Arg Leu Phe Pro Asn Ser Ser Ser Tyr Glu Gly Ile Lys Glu Lys Tyr		
275	280	285
Lys Asn Asn Ile Ile Tyr Ser Met Gln Asn Ser Thr Ser Tyr Phe Phe		
290	295	300
Asn Phe Asn Leu Asp Arg Lys Ser Tyr Asn Tyr Thr Ser Lys Thr Ser		
305	310	315
		320

Asp Ile Glu Lys Lys Ser Thr Gln Glu Ala Val Leu Asn Lys Asn Phe
 325 330 335
 Arg Gln Ala Ile Asn Phe Ala Phe Asp Arg Thr Ser Tyr Gly Ala Gln
 340 345 350
 Ser Glu Gly Lys Glu Gly Ala Thr Lys Ile Leu Arg Asn Leu Val Val
 355 360 365
 Pro Pro Asn Phe Val Ser Ile Lys Gly Lys Asp Phe Gly Glu Val Val
 370 375 380
 Ala Ser Lys Met Val Asn Tyr Gly Lys Glu Trp Gln Gly Ile Asn Phe
 385 390 395 400
 Ala Asp Gly Gln Asp Pro Tyr Tyr Asn Pro Glu Lys Ala Lys Ala Lys
 405 410 415
 Phe Ala Glu Ala Lys Lys Glu Leu Glu Ala Lys Gly Val Gln Phe Pro
 420 425 430
 Ile His Leu Asp Lys Thr Val Glu Val Thr Asp Lys Val Gly Ile Gln
 435 440 445
 Gly Val Ser Ser Ile Lys Gln Ser Ile Glu Ser Val Leu Gly Ser Asp
 450 455 460
 Asn Val Val Ile Asp Ile Gln Gln Leu Thr Ser Asp Glu Phe Asp Ser
 465 470 475 480
 Ser Gly Tyr Phe Ala Gln Thr Ala Ala Gln Lys Asp Tyr Asp Leu Tyr
 485 490 495
 His Gly Gly Trp Gly Pro Asp Tyr Gln Asp Pro Ser Thr Tyr Leu Asp
 500 505 510
 Ile Phe Asn Thr Asn Ser Gly Gly Phe Leu Gln Asn Leu Gly Leu Glu
 515 520 525
 Pro Gly Glu Ala Asn Asp Lys Ala Lys Ala Val Gly Leu Asp Val Tyr
 530 535 540

Thr Gln Met Leu Glu Glu Ala Asn Lys Glu Gln Asp Pro Ala Lys Arg
 545 550 555 560

Tyr Glu Lys Tyr Ala Asp Ile Gln Ala Trp Leu Ile Asp Ser Ser Leu
 565 570 575

Val Leu Pro Ser Val Ser Arg Gly Gly Thr Pro Ser Leu Arg Arg Thr
 580 585 590

Val Pro Phe Ala Ala Ala Tyr Gly Leu Thr Gly Thr Lys Gly Val Glu
 595 600 605

Ser Tyr Lys Tyr Leu Lys Val Gln Asp Lys Ile Val Thr Thr Asp Glu
 610 615 620

Tyr Ala Lys Ala Arg Glu Lys Trp Leu Lys Glu Lys Glu Glu Ser Asn
 625 630 635 640

Lys Lys Ala Gln Glu Glu Leu Ala Lys His Val Lys
 645 650

<210> 350

<211> 545

<212> PRT

<213> Streptococcus pneumoniae

<400> 350

Met Asn Glu Glu Ser Met Ser His Glu Asn Asn His Gln Gln Ala Gln
 1 5 10 15

Met Leu Arg Gly Thr Ala Trp Leu Thr Ala Ser Asn Phe Ile Ser Arg
 20 25 30

Leu Leu Gly Ala Val Tyr Ile Ile Pro Trp Tyr Ile Trp Met Gly Ala
 35 40 45

Tyr Ala Ala Lys Ala Asn Gly Leu Phe Thr Met Gly Tyr Asn Ile Tyr
 50 55 60

Ala Trp Phe Leu Leu Val Ser Thr Ala Gly Ile Pro Val Ala Val Ala
 65 70 75 80

Lys Gln Val Ala Lys Tyr Asn Thr Met Arg Glu Glu Glu His Ser Phe
 85 90 95

Ala Leu Ile Arg Ser Phe Leu Gly Phe Met Thr Gly Leu Gly Leu Val
 100 105 110

Phe Ala Leu Val Leu Tyr Val Phe Ala Pro Trp Leu Ala Asp Leu Ser
 115 120 125

Gly Val Gly Lys Asp Leu Ile Pro Ile Met Gln Ser Leu Ala Trp Gly
 130 135 140

Val Leu Ile Phe Pro Ser Met Ser Val Ile Arg Gly Phe Phe Gln Gly
 145 150 155 160

Met Asn Asn Leu Lys Pro Tyr Ala Met Ser Gln Ile Ala Glu Gln Val
 165 170 175

Ile Arg Val Ile Trp Met Leu Leu Ala Thr Phe Ile Ile Met Lys Leu
 180 185 190

Gly Ser Gly Asp Tyr Leu Ala Ala Val Thr Gln Ser Thr Phe Ala Ala
 195 200 205

Phe Val Gly Met Val Ala Ser Phe Ala Val Leu Ile Tyr Phe Leu Ala
 210 215 220

Gln Glu Gly Ser Leu Lys Arg Ile Phe Glu Thr Gly Asp Lys Ile Asn
 225 230 235 240

Ser Lys Arg Leu Leu Val Asp Thr Ile Lys Glu Ala Ile Pro Phe Ile
 245 250 255

Leu Thr Gly Ser Ala Ile Gln Leu Phe Gln Ile Leu Asp Gln Leu Thr
 260 265 270

Phe Ile Asn Ser Met Ser Trp Phe Thr Asn Tyr Ser Asn Glu Asp Leu
 275 280 285

Val Val Met Phe Ser Tyr Phe Ser Ala Asn Pro Asn Lys Ile Thr Met
 290 295 300

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Ile Leu Ile Ser Val Gly Val Ser Ile Gly Ser Val Gly Leu Pro Leu
305                      310                      315                      320

Leu Thr Glu Asn Tyr Val Lys Gly Asp Leu Lys Ala Ala Ser Arg Leu
                      325                      330                      335

Val Gln Asp Ser Leu Thr Leu Leu Phe Met Phe Leu Leu Pro Ala Thr
                      340                      345                      350

Val Gly Val Val Met Val Gly Glu Pro Leu Tyr Thr Val Phe Tyr Gly
                      355                      360                      365

Lys Pro Asp Ser Leu Ala Leu Gly Leu Phe Val Phe Ala Val Leu Gln
                      370                      375                      380

Ser Ile Ile Leu Gly Leu Tyr Met Val Leu Ser Pro Met Leu Gln Ala
385                      390                      395                      400

Met Phe Arg Asn Arg Lys Ala Val Leu Tyr Phe Ile Tyr Gly Ser Ile
                      405                      410                      415

Ala Lys Leu Val Leu Gln Leu Pro Thr Ile Ala Leu Phe His Ser Tyr
                      420                      425                      430

Gly Pro Leu Ile Ser Thr Thr Ile Ala Leu Ile Ile Pro Asn Val Leu
                      435                      440                      445

Met Tyr Arg Asp Ile Cys Lys Val Thr Gly Val Lys Arg Lys Val Ile
                      450                      455                      460

Leu Lys Arg Thr Ile Leu Ile Ser Leu Leu Thr Leu Val Met Phe Leu
465                      470                      475                      480

Leu Ile Gly Thr Ile Gln Trp Leu Leu Gly Phe Phe Phe Gln Pro Ser
                      485                      490                      495

Gly Arg Leu Trp Ser Phe Phe Tyr Val Ala Leu Val Gly Ala Met Gly
                      500                      505                      510

Gly Gly Leu Tyr Met Val Met Ser Leu Arg Thr Tyr Leu Leu Asp Lys

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515 520 525
 Val Ile Gly Lys Ala Gln Ala Asp Arg Leu Arg Ala Lys Phe Lys Leu
 530 535 540

 Ser
 545

 <210> 351
 <211> 209
 <212> FRT
 <213> Streptococcus pneumoniae

 <400> 351

 Met Gln Val Leu Leu Phe Cys Cys Asn Ile Phe Tyr Asn Asn Glu Arg
 1 5 10 15

 Val Leu Glu Ile Leu Arg Lys Arg Arg His Ile Met Ser Lys Lys Val
 20 25 30

 Leu Phe Ile Val Gly Ser Leu Arg Gln Gly Ser Phe Asn His Gln Met
 35 40 45

 Ala Leu Glu Ala Glu Lys Ala Leu Ala Gly Lys Ala Glu Val Ser Tyr
 50 55 60

 Leu Asp Tyr Ser Ala Leu Pro Leu Phe Ser Gln Asp Leu Glu Val Pro
 65 70 75 80

 Thr His Pro Ala Val Ala Ala Ala Arg Glu Ala Val Leu Val Ala Asp
 85 90 95

 Ala Ile Trp Ile Phe Ser Pro Val Tyr Asn Phe Ser Ile Pro Gly Thr
 100 105 110

 Val Lys Asn Leu Leu Asp Trp Leu Ser Arg Ala Leu Asp Leu Ser Asp
 115 120 125

 Thr Arg Gly Val Ser Ala Leu Gln Asp Lys Phe Val Thr Val Ser Ser
 130 135 140

 Val Ala Asn Ala Gly His Asp Gln Leu Phe Ala Ile Tyr Lys Asp Leu

145 150 155 160
 Leu Pro Phe Ile Arg Thr Gln Gly Val Gly Asp Phe Thr Ala Ala Arg
 165 170 175
 Val Asn Asp Ser Ala Trp Ala Asp Gly Lys Leu Val Leu Glu Glu Thr
 180 185 190
 Val Leu Asn Ser Leu Glu Lys Gln Ala Gln Asp Leu Val Glu Ala Ile
 195 200 205

 Lys

 <210> 352
 <211> 623
 <212> PRT
 <213> Streptococcus pneumoniae

 <400> 352
 Met Ser Asp Phe Ile Val Glu Lys Leu Ser Lys Ser Val Gly Asp Lys
 1 5 10 15

 Thr Val Phe Arg Asp Ile Ser Phe Ile Ile His Asp Leu Asp Arg Ile
 20 25 30

 Gly Leu Ile Gly Val Asn Gly Thr Gly Lys Thr Thr Leu Leu Asp Val
 35 40 45

 Leu Ser Gly Val Ser Gly Phe Asp Gly Asp Val Ser Pro Phe Ser Ala
 50 55 60

 Lys Asn Asp Tyr Gln Ile Gly Tyr Leu Thr Gln Asp Pro Asp Phe Asp
 65 70 75 80

 Asp Arg Lys Thr Val Leu Asp Thr Val Leu Ser Ser Glu Leu Lys Glu
 85 90 95

 Ile Gln Leu Ile Arg Glu Tyr Glu Leu Ile Met Leu Asp Tyr Ser Glu
 100 105 110

 Asp Lys Gln Ala Arg Leu Glu Arg Val Met Ala Glu Met Asp Ser Leu

115	120	125
Gln Ala Trp Glu Ile Glu Ser Gln Val Lys Thr Val Leu Ser Lys Leu 130 135 140		
Gly Ile Gln Asp Leu Ser Thr Pro Val Gly Glu Leu Ser Gly Gly Leu 145 150 155 160		
Arg Arg Arg Val Gln Leu Ala Gln Val Leu Leu Gly Asn His Asp Leu 165 170 175		
Leu Leu Leu Asp Glu Pro Thr Asn His Leu Asp Ile Ala Ile Ile Glu 180 185 190		
Trp Leu Thr Leu Phe Leu Lys Asn Ser Lys Lys Thr Val Leu Phe Ile 195 200 205		
Thr His Asp Arg Tyr Phe Leu Asp Ala Leu Ser Thr Arg Ile Phe Glu 210 215 220		
Leu Asp Arg Ala Gly Leu Thr Glu Tyr Gln Gly Asn Tyr Gln Asp Tyr 225 230 235 240		
Val Arg Leu Lys Ala Glu Gln Asp Glu Arg Asp Ala Ala Leu Leu His 245 250 255		
Lys Lys Glu Gln Leu Tyr Lys Gln Glu Leu Ala Trp Met Arg Arg Gln 260 265 270		
Pro Gln Ala Arg Ala Thr Lys Gln Gln Ala Arg Ile Asn Arg Phe His 275 280 285		
Asp Leu Lys Lys Glu Val Ser Gly Ser Ser Ala Glu Thr Asp Leu Thr 290 295 300		
Met Asn Phe Glu Thr Ser Arg Ile Gly Lys Lys Val Ile Glu Phe Gln 305 310 315 320		
Asp Val Ser Phe Ala Tyr Glu Asn Lys Pro Ile Leu Gln Asn Phe Asn 325 330 335		

Leu Leu Val Gln Ala Lys Asp Arg Ile Gly Ile Val Gly Asp Asn Gly
 340 345 350

Val Gly Lys Ser Thr Leu Leu Asn Leu Ile Ala Gly Ser Leu Glu Pro
 355 360 365

Thr Ala Gly Gln Val Val Ile Gly Glu Thr Val Arg Ile Ala Tyr Phe
 370 375 380

Ser Gln Gln Ile Glu Gly Leu Asp Glu Ser Lys Arg Val Ile Asn Tyr
 385 390 395 400

Leu Gln Glu Val Ala Glu Glu Val Lys Thr Ser Gly Gly Ser Thr Thr
 405 410 415

Ser Ile Ala Glu Leu Leu Glu Gln Phe Leu Phe Pro Arg Ser Thr His
 420 425 430

Gly Thr Leu Ile Glu Lys Leu Ser Gly Gly Glu Lys Lys Arg Leu Tyr
 435 440 445

Leu Leu Lys Leu Leu Leu Glu Lys Pro Asn Val Leu Leu Leu Asp Glu
 450 455 460

Pro Thr Asn Asp Leu Asp Ile Ala Thr Leu Thr Val Leu Glu Asn Phe
 465 470 475 480

Leu Gln Gly Phe Ala Gly Pro Val Leu Thr Val Ser His Asp Arg Tyr
 485 490 495

Phe Leu Asp Lys Val Ala Thr Lys Ile Leu Ala Phe Glu Asp Gly Lys
 500 505 510

Ile Arg Pro Phe Phe Gly His Tyr Thr Asp Tyr Leu Asp Glu Lys Ala
 515 520 525

Phe Glu Thr Asp Met Ala Asn Gln Val Gln Lys Ala Glu Lys Glu Lys
 530 535 540

Val Val Lys Val Arg Glu Asp Lys Lys Arg Met Thr Tyr Gln Glu Lys
 545 550 555 560

Gln Glu Trp Ala Ser Ile Glu Gly Asp Ile Glu Thr Leu Glu Lys Arg
565 570 575

Ile Ala Ala Ile Glu Glu Glu Met Gln Ala Asn Gly Ser Asp Phe Gly
580 585 590

Lys Leu Ala Thr Leu Gln Lys Glu Leu Asp Glu Lys Asn Glu Ala Leu
595 600 605

Leu Glu Lys Tyr Glu Arg Tyr Glu Tyr Leu Ser Glu Phe Asp Ser
610 615 620

<210> 353

<211> 178

<212> PRT

<213> Streptococcus pneumoniae

<400> 353

Met Asn Glu Val Lys Lys Met Val Glu Leu Lys Lys Glu Ala Val Lys
1 5 10 15

Asp Val Thr Ser Leu Thr Lys Ala Ala Pro Val Ala Leu Ala Lys Thr
20 25 30

Lys Glu Val Leu Asn Gln Ala Val Ala Asp Leu Tyr Val Ala His Val
35 40 45

Ala Leu His Gln Val His Trp Tyr Met His Gly Arg Gly Phe Leu Val
50 55 60

Trp His Pro Lys Met Asp Glu Tyr Met Glu Ala Leu Asp Gly Gln Leu
65 70 75 80

Asp Glu Ile Ser Glu Arg Leu Ile Thr Leu Gly Gly Ser Pro Phe Ser
85 90 95

Thr Leu Thr Glu Phe Leu Gln Asn Ser Glu Ile Glu Glu Ala Gly
100 105 110

Glu Tyr Arg Asn Val Glu Glu Ser Leu Glu Arg Val Leu Val Ile Tyr
115 120 125

Arg Tyr Leu Ser Glu Leu Phe Gln Lys Gly Leu Asp Val Thr Asp Glu
 130 135 140

Glu Gly Asp Asp Val Thr Asn Gly Ile Phe Ala Gly Ala Lys Thr Glu
 145 150 155 160

Thr Asp Lys Thr Ile Trp Met Leu Ala Ala Glu Leu Gly Gln Ala Pro
 165 170 175

Gly Leu

<210> 354
 <211> 356
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 354

Met Phe Gly Leu Ile Gly Cys Ile Tyr Gly Ala Phe Gly Arg Lys Ile
 1 5 10 15

Trp Ser Glu Ser His Gly Lys Ser Ile Cys Phe Ser Ile Arg Arg Trp
 20 25 30

Lys Tyr Leu Asn Arg Ile Cys Asn Arg Pro Ser Glu Leu Trp Leu Leu
 35 40 45

Tyr Leu Ala Tyr Gly Ile Leu Gly Gly Leu Gly Leu Gly Ala Gly Tyr
 50 55 60

Ile Thr Pro Val Ser Thr Ile Ile Lys Trp Phe Pro Asp Lys Arg Gly
 65 70 75 80

Leu Ala Thr Gly Leu Ala Ile Met Gly Phe Gly Phe Ala Ser Leu Leu
 85 90 95

Thr Ser Pro Ile Ala Gln His Leu Ile Ala Gly Val Gly Leu Val Glu
 100 105 110

Thr Phe Tyr Ile Leu Gly Ala Ser Tyr Phe Ile Ile Met Leu Leu Ala
 115 120 125

Ser Gln Phe Ile Lys Arg Pro Asn Glu Gln Glu Leu Ala Ile Leu Ser
 130 135 140

Ser Ser Gly Lys Glu Lys Thr Ala Ser Leu Thr Gln Gly Met Ala Ala
 145 150 155 160

Asn Gln Ala Leu Lys Ser Asn Arg Phe Tyr Met Leu Trp Ile Ile Phe
 165 170 175

Phe Ile Asn Ile Ala Cys Gly Leu Gly Leu Ile Ser Ala Ala Ser Pro
 180 185 190

Met Ala Gln Glu Met Ala Gly Leu Ser Thr Ser His Ala Ala Val Met
 195 200 205

Val Gly Val Leu Gly Ile Phe Asn Gly Phe Gly Arg Leu Leu Trp Ala
 210 215 220

Ser Leu Ser Asp Tyr Ile Gly Arg Pro Leu Thr Phe Ser Ile Leu Leu
 225 230 235 240

Leu Val Asn Leu Phe Phe Ser Leu Ser Leu Trp Leu Phe Thr Asp Ser
 245 250 255

Val Leu Phe Val Val Ala Met Ser Ile Leu Met Thr Cys Tyr Gly Ala
 260 265 270

Gly Phe Ser Leu Ile Pro Ala Tyr Leu Ser Asp Ile Phe Gly Thr Lys
 275 280 285

Glu Leu Ala Ala Leu His Gly Tyr Ile Leu Thr Ala Trp Ala Met Ala
 290 295 300

Gly Leu Ala Gly Pro Ile Leu Leu Ala Glu Thr Tyr Lys Met Ala His
 305 310 315 320

Ser Tyr Thr Gln Thr Leu Phe Val Phe Leu Ile Leu Tyr Ser Ile Ala
 325 330 335

Leu Ala Leu Ser Tyr Tyr Leu Gly Arg Ser Ile Lys Lys Glu Ser Gln
 340 345 350

Lys Ala Leu Thr
355

<210> 355
<211> 153
<212> PRT
<213> Streptococcus pneumoniae

<400> 355

Met Lys Gln Thr Lys Thr Thr Lys Ile Ala Leu Val Ser Leu Leu Thr
1 5 10 15

Ala Leu Ser Val Val Leu Gly Tyr Phe Leu Lys Ile Pro Thr Pro Thr
20 25 30

Gly Ile Leu Thr Leu Leu Asp Ala Gly Val Phe Phe Ala Ala Phe Tyr
35 40 45

Phe Gly Ser Arg Glu Gly Ala Val Val Gly Gly Leu Ala Ser Phe Leu
50 55 60

Ile Asp Leu Leu Ser Gly Tyr Pro Gln Trp Met Phe Phe Ser Leu Val
65 70 75 80

Asn His Gly Leu Gln Gly Phe Phe Ala Gly Phe Lys Gly Lys Ser Gln
85 90 95

Trp Leu Gly Leu Ile Leu Ala Thr Ile Ala Met Val Gly Gly Tyr Ala
100 105 110

Leu Gly Ser Ala Leu Met Asn Gly Trp Ala Ala Ala Leu Pro Glu Ile
115 120 125

Leu Pro Asn Phe Met Gln Asn Met Val Gly Met Ile Val Gly Phe Ile
130 135 140

Leu Ser Gln Ser Ile Lys Lys Ile Lys
145 150

<210> 356
<211> 225

<212> PRT

<213> *Streptococcus pneumoniae*

<400> 356

Met Ile Ser Lys Arg Leu Glu Leu Val Ala Ser Phe Val Ser Gln Gly
 1 5 10 15

Ala Ile Leu Leu Asp Val Gly Ser Asp His Ala Tyr Leu Pro Ile Glu
 20 25 30

Leu Val Glu Arg Gly Gln Ile Lys Ser Ala Ile Ala Gly Glu Val Val
 35 40 45

Glu Gly Pro Tyr Gln Ser Ala Val Lys Asn Val Glu Ala His Gly Leu
 50 55 60

Lys Glu Lys Ile Gln Val Arg Leu Ala Asn Gly Leu Ala Ala Phe Glu
 65 70 75 80

Glu Thr Asp Gln Val Ser Val Ile Thr Ile Ala Gly Met Gly Gly Arg
 85 90 95

Leu Ile Ala Arg Ile Leu Glu Glu Gly Leu Gly Lys Leu Ala Asn Val
 100 105 110

Glu Arg Leu Ile Leu Gln Pro Asn Asn Arg Glu Asp Asp Leu Arg Ile
 115 120 125

Trp Leu Gln Asp His Gly Phe Gln Ile Val Ala Glu Ser Ile Leu Glu
 130 135 140

Glu Ala Gly Lys Phe Tyr Glu Ile Leu Val Val Glu Ala Gly Gln Met
 145 150 155 160

Lys Leu Ser Ala Ser Asp Val Arg Phe Gly Pro Phe Leu Ser Lys Glu
 165 170 175

Val Ser Pro Val Phe Val Gln Lys Trp Gln Lys Glu Ala Glu Lys Leu
 180 185 190

Glu Phe Ala Leu Gly Gln Ile Pro Glu Lys Asn Leu Glu Glu Arg Gln
 195 200 205

Val Leu Val Asp Lys Ile Gln Ala Ile Lys Glu Val Leu His Val Ser
 210 215 220

Lys
 225

<210> 357
 <211> 108
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 357

Met Glu Gly Ile Arg Met Lys Ile Val Gly Val Ala Ala Cys Thr Val
 1 5 10 15

Gly Ile Ala His Thr Tyr Ile Ala Gln Glu Lys Leu Glu Asn Ala Ala
 20 25 30

Lys Val Ala Gly His Val Ile His Val Glu Thr Gln Gly Thr Ile Gly
 35 40 45

Val Glu Asn Glu Leu Ser Gln Glu Gln Ile Asp Ala Ala Asp Val Val
 50 55 60

Ile Leu Ala Val Asp Val Lys Ile Ser Gly Met Glu Arg Phe Glu Gly
 65 70 75 80

Lys Lys Ile Ile Lys Val Pro Thr Glu Val Ala Val Lys Ser Pro Asn
 85 90 95

Lys Leu Ile Ala Lys Ala Val Glu Ile Val Thr Lys
 100 105

<210> 358
 <211> 240
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 358

Met Ile Arg Ile Glu Asn Leu Ser Val Ser Tyr Lys Glu Thr Leu Ala
 1 5 10 15

Leu Lys Asp Ile Ser Leu Val Leu His Gly Pro Thr Ile Thr Gly Ile
 20 25 30

Ile Gly Pro Asn Gly Ala Gly Lys Ser Thr Leu Leu Lys Gly Met Leu
 35 40 45

Gly Ile Ile Pro His Gln Gly Gln Ala Phe Leu Asp Asp Lys Glu Val
 50 55 60

Lys Lys Ser Leu His Arg Ile Ala Tyr Val Glu Gln Lys Ile Asn Ile
 65 70 75 80

Asp Tyr Asn Phe Pro Ile Lys Val Lys Glu Cys Val Ser Leu Gly Leu
 85 90 95

Phe Pro Ser Ile Pro Leu Phe Arg Ser Leu Lys Ala Lys His Trp Lys
 100 105 110

Lys Val Gln Glu Ala Leu Glu Ile Val Gly Leu Ala Asp Tyr Ala Glu
 115 120 125

Arg Gln Ile Ser Gln Leu Ser Gly Gly Gln Phe Gln Arg Val Leu Ile
 130 135 140

Ala Arg Cys Leu Val Gln Glu Ala Asp Tyr Ile Leu Leu Asp Glu Pro
 145 150 155 160

Phe Ala Gly Ile Asp Ser Val Ser Glu Glu Ile Ile Met Asn Thr Leu
 165 170 175

Arg Asp Leu Lys Lys Ala Gly Lys Thr Val Leu Ile Val His His Asp
 180 185 190

Leu Ser Lys Ile Pro His Tyr Phe Asp Gln Val Leu Leu Val Asn Arg
 195 200 205

Glu Val Ile Ala Phe Gly Pro Thr Lys Glu Thr Phe Thr Glu Thr Asn
 210 215 220

Leu Lys Glu Ala Tyr Gly Asn Gln Leu Phe Phe Asn Gly Gly Asp Leu
 225 230 235 240

<210> 359

<211> 294

<212> PRT

<213> *Streptococcus pneumoniae*

<400> 359

Met Thr Tyr Tyr Val Ala Ile Asp Ile Gly Gly Thr Asn Ile Lys Tyr
 1 5 10 15

Gly Leu Val Asp Gln Glu Gly Gln Leu Leu Glu Ser His Glu Met Pro
 20 25 30

Thr Glu Ala His Lys Gly Gly Pro His Ile Leu Gln Lys Thr Lys Asp
 35 40 45

Ile Val Ala Ser Tyr Leu Glu Lys Gly Pro Val Ala Gly Val Ala Ile
 50 55 60

Ser Ser Ala Gly Met Val Asp Pro Asp Lys Gly Glu Ile Phe Tyr Ala
 65 70 75 80

Gly Pro Gln Ile Pro Asn Tyr Ala Gly Thr Gln Phe Lys Lys Glu Ile
 85 90 95

Glu Glu Ser Phe Thr Ile Pro Cys Glu Ile Glu Asn Asp Val Asn Cys
 100 105 110

Ala Gly Leu Ala Glu Ala Val Ser Gly Ser Gly Lys Gly Ala Ser Val
 115 120 125

Thr Leu Cys Leu Thr Ile Gly Thr Gly Ile Gly Gly Cys Leu Ile Met
 130 135 140

Asp Arg Lys Val Phe His Gly Phe Ser Asn Ser Ala Cys Glu Val Gly
 145 150 155 160

Tyr Met His Met Gln Asp Gly Ala Phe Gln Asp Leu Ala Ser Thr Thr
 165 170 175

Ala Leu Val Lys Tyr Val Ala Glu Ala His Gly Glu Asp Val Asp Gln
 180 185 190

Trp Asn Gly Arg Arg Ile Phe Lys Glu Ala Thr Glu Gly Asn Lys Ile
 195 200 205

Cys Met Glu Gly Ile Asp Arg Met Val Asp Tyr Leu Gly Lys Gly Leu
 210 215 220

Ala Asn Ile Cys Tyr Val Ala Asn Pro Glu Val Val Ile Leu Gly Gly
 225 230 235 240

Gly Ile Met Gly Gln Glu Ala Ile Leu Lys Pro Lys Ile Arg Thr Ala
 245 250 255

Leu Lys Glu Ala Leu Val Pro Ser Leu Ala Glu Lys Thr Arg Leu Glu
 260 265 270

Phe Ala His His Gln Asn Thr Ala Gly Met Leu Gly Ala Tyr Tyr His
 275 280 285

Phe Lys Thr Lys Gln Ser
 290

<210> 360

<211> 214

<212> PRT

<213> Streptococcus pneumoniae

<400> 360

Met Ala Gln Lys Gly Val Ser Leu Ile Lys Ala Ala Phe Asp Thr Asp
 1 5 10 15

Asn Phe Leu Met Arg Phe Ser Glu Lys Val Leu Asp Ile Val Thr Ala
 20 25 30

Asn Leu Leu Phe Val Val Ser Cys Leu Pro Ile Val Thr Ile Gly Val
 35 40 45

Ala Lys Ile Ser Leu Tyr Glu Thr Met Phe Glu Val Lys Lys Ser Arg
 50 55 60

Arg Val Pro Val Phe Lys Ile Tyr Leu Arg Ser Phe Lys Gln Asn Leu
 65 70 75 80

Lys Leu Gly Leu Gln Leu Gly Leu Met Glu Leu Gly Ile Val Phe Leu
85 90 95

Thr Leu Ser Asp Leu Tyr Leu Phe Trp Gly Gln Thr Ala Leu Pro Phe
100 105 110

Gln Leu Leu Lys Ala Ile Cys Leu Gly Ile Leu Ile Phe Leu Thr Ile
115 120 125

Val Met Leu Ala Ser Tyr Pro Ile Ala Ala Arg Tyr Asp Leu Ser Trp
130 135 140

Lys Glu Ile Leu Gln Lys Gly Leu Met Leu Ala Ser Phe Asn Phe Pro
145 150 155 160

Trp Phe Phe Leu Met Leu Ala Ile Leu Val Leu Ile Val Met Val Leu
165 170 175

Tyr Leu Ser Ala Phe Ser Leu Leu Leu Gly Gly Ser Val Phe Leu Leu
180 185 190

Phe Gly Phe Gly Leu Leu Val Phe Ile Gln Thr Gly Leu Met Glu Lys
195 200 205

Ile Phe Ala Lys Tyr Gln
210

<210> 361

<211> 294

<212> PRT

<213> Streptococcus pneumoniae

<400> 361

Met Val Lys Glu Arg Asn Leu Thr Arg Trp Ile Phe Val Leu Pro Ala
1 5 10 15

Met Ile Ile Val Gly Leu Leu Phe Val Tyr Pro Phe Phe Ser Ser Ile
20 25 30

Phe Tyr Ser Phe Thr Asn Lys His Leu Ile Met Pro Asn Tyr Lys Phe
35 40 45

Val Gly Leu Ala Asn Tyr Lys Ala Val Leu Ser Asp Pro Asn Phe Phe
 50 55 60
 Asn Ala Phe Phe Asn Ser Ile Lys Trp Thr Val Phe Ser Leu Val Gly
 65 70 75 80
 Gln Val Leu Val Gly Phe Val Leu Ala Leu Ala Leu His Arg Val Arg
 85 90 95
 His Phe Lys Lys Leu Tyr Arg Thr Leu Leu Ile Val Pro Trp Ala Phe
 100 105 110
 Pro Thr Ile Val Ile Ala Phe Ser Trp Gln Trp Ile Leu Asn Gly Val
 115 120 125
 Tyr Gly Tyr Leu Pro Asn Leu Ile Val Lys Leu Gly Leu Met Glu His
 130 135 140
 Thr Pro Ala Phe Leu Thr Asp Ser Thr Trp Ala Phe Leu Cys Leu Val
 145 150 155 160
 Phe Ile Asn Ile Trp Phe Gly Ala Pro Met Ile Met Val Asn Val Leu
 165 170 175
 Ser Ala Leu Gln Thr Val Pro Glu Glu Gln Phe Glu Ala Ala Lys Ile
 180 185 190
 Asp Gly Ala Ser Ser Trp Gln Val Phe Lys Phe Ile Val Phe Pro His
 195 200 205
 Ile Lys Val Val Val Gly Leu Leu Val Val Leu Arg Thr Val Trp Ile
 210 215 220
 Phe Asn Asn Phe Asp Ile Ile Tyr Leu Ile Thr Gly Gly Gly Pro Ala
 225 230 235 240
 Asn Ala Thr Thr Thr Leu Pro Ile Phe Ala Tyr Asn Leu Gly Trp Gly
 245 250 255
 Thr Lys Leu Leu Gly Arg Ala Ser Ala Val Thr Val Leu Leu Phe Ile

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260
265
270
Phe Leu Val Ala Ile Cys Phe Ile Tyr Phe Ala Ile Ile Ser Lys Trp
275
280
285
Glu Lys Glu Gly Arg Lys
290
<210> 362
<211> 445
<212> PRT
<213> Streptococcus pneumoniae
<400> 362
Met Lys Lys Met Arg Lys Phe Leu Cys Leu Ala Gly Ile Ala Leu Ala
1 5 10 15
Ala Val Ala Leu Val Ala Cys Ser Gly Lys Lys Glu Ala Thr Thr Ser
20 25 30
Thr Glu Pro Pro Thr Glu Leu Ser Gly Glu Ile Thr Met Trp His Ser
35 40 45
Phe Thr Gln Gly Pro Arg Leu Glu Ser Ile Gln Lys Ser Ala Asp Ala
50 55 60
Phe Met Gln Lys His Pro Lys Thr Lys Ile Lys Ile Glu Thr Phe Ser
65 70 75 80
Trp Asn Asp Phe Tyr Thr Lys Trp Thr Thr Gly Leu Ala Asn Gly Asn
85 90 95
Val Pro Asp Ile Ser Thr Ala Leu Pro Asn Gln Val Met Glu Met Val
100 105 110
Asn Ser Asp Ala Leu Val Pro Leu Asn Asp Ser Ile Lys Arg Ile Gly
115 120 125
Gln Asp Lys Phe Asn Glu Thr Ala Leu Asn Glu Ala Lys Ile Gly Asp
130 135 140
Asp Tyr Tyr Ser Val Pro Leu Tyr Ser His Ala Gln Val Met Trp Val

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145		150		155		160
Arg Thr Asp Leu Leu Lys Glu His Asn Ile Glu Val Pro Lys Thr Trp						
	165			170		175
Asp Gln Leu Tyr Glu Ala Ser Lys Lys Leu Lys Glu Ala Gly Val Tyr						
	180		185			190
Gly Leu Ser Val Pro Phe Gly Thr Asn Asp Leu Met Ala Thr Arg Phe						
	195		200			205
Leu Asn Phe Tyr Val Arg Ser Gly Gly Gly Ser Leu Leu Thr Lys Asp						
	210		215			220
Leu Lys Ala Asp Leu Thr Ser Gln Leu Ala Gln Asp Gly Ile Lys Tyr						
	225		230		235	240
Trp Val Lys Leu Tyr Lys Glu Ile Ser Pro Gln Asp Ser Leu Asn Phe						
	245			250		255
Asn Val Leu Gln Gln Ala Thr Leu Phe Tyr Gln Gly Lys Thr Ala Phe						
	260			265		270
Asp Phe Asn Ser Gly Phe His Ile Gly Gly Ile Asn Ala Asn Ser Pro						
	275		280			285
Gln Leu Ile Asp Ser Ile Asp Ala Tyr Pro Ile Pro Lys Ile Lys Glu						
	290		295			300
Ser Asp Lys Asp Gln Gly Ile Glu Thr Ser Asn Ile Pro Met Val Val						
	305		310		315	320
Trp Lys Asn Ser Lys His Pro Glu Val Ala Lys Ala Phe Leu Glu Ala						
	325			330		335
Leu Tyr Asn Glu Glu Asp Tyr Val Lys Phe Leu Asp Ser Thr Pro Val						
	340			345		350
Gly Met Leu Pro Thr Ile Lys Gly Ile Ser Asp Ser Ala Ala Tyr Lys						
	355		360			365

Glu Asn Glu Thr Arg Lys Lys Phe Lys His Ala Glu Glu Val Ile Thr
 370 375 380

Glu Ala Val Lys Lys Gly Thr Ala Ile Gly Tyr Glu Asn Gly Pro Ser
 385 390 395 400

Val Gln Ala Gly Met Leu Thr Asn Gln His Ile Ile Glu Gln Met Phe
 405 410 415

Gln Asp Ile Ile Thr Asn Gly Thr Asp Pro Met Lys Ala Ala Lys Glu
 420 425 430

Ala Glu Lys Gln Leu Asn Asp Leu Phe Glu Ala Val Gln
 435 440 445

<210> 363

<211> 800

<212> PRT

<213> Streptococcus pneumoniae

<400> 363

Met Ser Tyr Phe Arg Asn Arg Asp Ile Asp Ile Glu Arg Ile Ser Met
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Asn Arg Ser Val Gln Glu Arg Lys Cys Arg Tyr Ser Ile Arg Lys Leu
 20 25 30

Ser Val Gly Ala Val Ser Met Ile Val Gly Ala Val Val Phe Gly Thr
 35 40 45

Ser Pro Val Leu Ala Gln Glu Gly Ala Ser Glu Gln Pro Leu Ala Asn
 50 55 60

Glu Thr Gln Leu Ser Gly Glu Ser Ser Thr Leu Thr Asp Thr Glu Lys
 65 70 75 80

Ser Gln Pro Ser Ser Glu Thr Glu Leu Ser Gly Asn Lys Gln Glu Gln
 85 90 95

Glu Arg Lys Asp Lys Gln Glu Glu Lys Ile Pro Arg Asp Tyr Tyr Ala
 100 105 110

Arg Asp Leu Glu Asn Val Glu Thr Val Ile Glu Lys Glu Asp Val Glu
 115 120 125

Thr Asn Ala Ser Asn Gly Gln Arg Val Asp Leu Ser Ser Glu Leu Asp
 130 135 140

Lys Leu Lys Lys Leu Glu Asn Ala Thr Val His Met Glu Phe Lys Pro
 145 150 155 160

Asp Ala Lys Ala Pro Ala Phe Tyr Asn Leu Phe Ser Val Ser Ser Ala
 165 170 175

Thr Lys Lys Asp Glu Tyr Phe Thr Met Ala Val Tyr Asn Asn Thr Ala
 180 185 190

Thr Leu Glu Gly Arg Gly Ser Asp Gly Lys Gln Phe Tyr Asn Asn Tyr
 195 200 205

Asn Asp Ala Pro Leu Lys Val Lys Pro Gly Gln Trp Asn Ser Val Thr
 210 215 220

Phe Thr Val Glu Lys Pro Thr Ala Glu Leu Pro Lys Gly Arg Val Arg
 225 230 235 240

Leu Tyr Val Asn Gly Val Leu Ser Arg Thr Ser Leu Arg Ser Gly Asn
 245 250 255

Phe Ile Lys Asp Met Pro Asp Val Thr His Val Gln Ile Gly Ala Thr
 260 265 270

Lys Arg Ala Asn Asn Thr Val Trp Gly Ser Asn Leu Gln Ile Arg Asn
 275 280 285

Leu Thr Val Tyr Asn Arg Ala Leu Thr Pro Glu Glu Val Gln Lys Arg
 290 295 300

Ser Gln Leu Phe Lys Arg Ser Asp Leu Glu Lys Lys Leu Pro Glu Gly
 305 310 315 320

Ala Ala Leu Thr Glu Lys Thr Asp Ile Phe Glu Ser Gly Arg Asn Gly
 325 330 335

Asn Pro Asn Lys Asp Gly Ile Lys Ser Tyr Arg Ile Pro Ala Leu Leu
 340 345 350

Lys Thr Asp Lys Gly Thr Leu Ile Ala Gly Ala Asp Glu Arg Arg Leu
 355 360 365

His Ser Ser Asp Trp Gly Asp Ile Gly Met Val Ile Arg Arg Ser Glu
 370 375 380

Asp Asn Gly Lys Thr Trp Gly Asp Arg Val Thr Ile Thr Asn Leu Arg
 385 390 395 400

Asp Asn Pro Lys Ala Ser Asp Pro Ser Ile Gly Ser Pro Val Asn Ile
 405 410 415

Asp Met Val Leu Val Gln Asp Pro Glu Thr Lys Arg Ile Phe Ser Ile
 420 425 430

Tyr Asp Met Phe Pro Glu Gly Lys Gly Ile Phe Gly Met Ser Ser Gln
 435 440 445

Lys Glu Glu Ala Tyr Lys Lys Ile Asp Gly Lys Thr Tyr Gln Ile Leu
 450 455 460

Tyr Arg Glu Gly Glu Lys Gly Ala Tyr Thr Ile Arg Glu Asn Gly Thr
 465 470 475 480

Val Tyr Thr Pro Asp Gly Lys Ala Thr Asp Tyr Arg Val Val Val Asp
 485 490 495

Pro Val Lys Pro Ala Tyr Ser Asp Lys Gly Asp Leu Tyr Lys Gly Asp
 500 505 510

Gln Leu Leu Gly Asn Ile Tyr Phe Thr Thr Asn Lys Thr Ser Pro Phe
 515 520 525

Arg Ile Ala Lys Asp Ser Tyr Leu Trp Met Ser Tyr Ser Asp Asp Asp
 530 535 540

Gly Lys Thr Trp Ser Ala Pro Gln Asp Ile Thr Pro Met Val Lys Ala
 545 550 555 560

Asp Trp Met Lys Phe Leu Gly Val Gly Pro Gly Thr Gly Ile Val Leu
565 570 575

Arg Asn Gly Pro His Lys Gly Arg Ile Leu Ile Pro Val Tyr Thr Thr
580 585 590

Asn Asn Val Ser His Leu Asp Gly Ser Gln Ser Ser Arg Val Ile Tyr
595 600 605

Ser Asp Asp His Gly Lys Thr Trp His Ala Gly Glu Ala Val Asn Asp
610 615 620

Asn Arg Gln Val Asp Gly Gln Lys Ile His Ser Ser Thr Met Asn Asn
625 630 635 640

Arg Arg Ala Gln Asn Thr Glu Ser Thr Val Val Gln Leu Asn Asn Gly
645 650 655

Asp Val Lys Leu Phe Met Arg Gly Leu Thr Gly Asp Leu Gln Val Ala
660 665 670

Thr Ser Lys Asp Gly Gly Val Thr Trp Glu Lys Asp Ile Lys Arg Tyr
675 680 685

Pro Gln Val Lys Asp Val Tyr Val Gln Met Ser Ala Ile His Thr Met
690 695 700

His Glu Gly Lys Glu Tyr Ile Ile Leu Ser Asn Ala Gly Gly Pro Lys
705 710 715 720

Arg Glu Asn Gly Met Val His Leu Ala Arg Val Glu Glu Asn Gly Glu
725 730 735

Leu Thr Trp Leu Lys His Asn Pro Ile Gln Lys Gly Glu Phe Ala Tyr
740 745 750

Asn Ser Leu Gln Glu Leu Gly Asn Gly Glu Tyr Gly Ile Leu Tyr Glu
755 760 765

His Thr Glu Lys Gly Gln Asn Ala Tyr Thr Leu Ser Phe Arg Lys Phe

770	775	780
Asn Trp Glu Phe Leu Ser	Lys Asn Leu Ile Ser	Pro Thr Glu Ala Asn
785	790	795 800
<210> 364		
<211> 210		
<212> PRT		
<213> Streptococcus pneumoniae		
<400> 364		
Met Arg Leu Glu Ile	Ile Asn Gly Gln Lys	Ile Tyr Gly Lys Arg Pro
1	5	10 15
Ile Leu Asn Gln Leu	Asn Leu Val Phe Gln	Ser Gly Lys Ile Tyr Gly
	20	25 30
Leu Lys Gly Asp Asn	Gly Ser Gly Lys Thr	Val Leu Leu Lys Ile Leu
	35	40 45
Ala Gly Tyr Ile Lys	Leu Asp Lys Gly Lys	Val Leu Gln Asp Gly Lys
	50	55 60
Val Tyr Gly Val Lys	Asn His Tyr Ile Gln	Asp Ala Gly Ile Leu Ile
65	70	75 80
Glu Lys Val Glu Phe	Leu Ser His Leu Ser	Leu Arg Glu Asn Leu Glu
	85	90 95
Leu Leu Arg Tyr Phe	Ser Ser Lys Val Thr	Glu Lys Arg Ile Ala Tyr
	100	105 110
Trp Ile Gln Tyr Tyr	Asp Leu Gln Glu Phe	Glu Asp Ile Glu Tyr Arg
	115	120 125
His Leu Ser Leu Gly	Thr Lys Gln Lys Met	Ala Leu Ile Gln Ala Phe
	130	135 140
Ile Ser Ser Pro Ser	Ile Leu Phe Leu Asp	Glu Pro Met Asn Ala Leu
145	150	155 160
Asp Glu Lys Ser Val Arg Leu Thr Lys Gln Val Ile Leu Ser Tyr Leu		